City of Seattle

LOWER DUWAMISH WATERWAY
SLIP 4 EARLY ACTION AREA

FINAL REMOVAL ACTION WORK PLAN

Submitted to
U.S. Environmental Protection Agency, Region 10
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Seattle, WA 98101

Submitted by
City of Seattle

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ACRONYMS AND ABBREVIATIONS

ACOM	agency construction oversight manager
ACSM	American Congress of Surveying and Mapping
AOC	Administrative Order on Consent
ASAOC	administrative settlement agreement and order on consent
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (aka Superfund)
CFR	Code of Federal Regulations
City	City of Seattle
COM	construction oversight manager
Contractor	General Construction Company
CPM	Contractor project manager
CQA	construction quality assurance
CQAP	construction quality assurance plan
CQC	construction quality control
CQCR	Contractor quality control representative
Crowley	Crowley Marine Services, Inc.
CWA	Clean Water Act
DAR	Design Analysis Report
DTM	Digital Terrain Model
EAA	early action area

Ecology	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
ESC	erosion and sediment control
GAC	granular activated carbon
GCC	General Construction Company
HAZWOPER	hazardous waste operations and emergency response
ICIP	institutional control implementation plan
Integral	Integral Consulting Inc.
KRS	KRS Marine LLC
LDW	lower Duwamish waterway
LDWG	Lower Duwamish Waterway Group
MIT	Muckleshoot Indian Tribe
MLLW	mean lower low water
NELAP	National Environmental Laboratory Accreditation Program
OHS	oil and hazardous substance
PCB	polychlorinated biphenyl
PLS	professional land surveyor
PM	City project manager
PPE	personal protective equipment
PS	City project specifier
QAO	quality assurance officer
QAPP	quality assurance project plan
RACR	removal action completion report

RAWP	removal action work plan
RE	City resident engineer
RFI	request for information
Rhine	Rhine Demolition Company
RTK	real time kinematic
RPM	remedial project manager
SCM	supervising construction manager
SOW	statement of work
SPCC	spill prevention control and countermeasures
SVOC	semivolatile organic compound
TESC	temporary erosion and sediment control
TIN	triangulated irregular network
TOC	total organic carbon
TWIC	Transportation Worker Identification Credential
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
WQMP	water quality monitoring plan
XYZ	easting, northing, elevation

1 INTRODUCTION

This Removal Action Work Plan (RAWP) outlines the implementation phase of the removal action for the Slip 4 Early Action Area (EAA), located within the Lower Duwamish Waterway (LDW) Superfund Site in Seattle, Washington (Figure 1-1). The purpose of the removal action is to address contaminated marine sediments and adjacent shoreline bank areas within the Slip 4 EAA.

Selection of the Slip 4 removal action is documented in the U.S. Environmental Protection Agency's (EPA) Action Memorandum (USEPA 2006a). The removal action is being conducted as a Non-Time-Critical Removal Action by the City of Seattle (City) under an Administrative Settlement Agreement and Order on Consent (ASAOC) (USEPA 2006b). This RAWP has been prepared in accordance with specific requirements set forth in the Statement of Work (SOW, Appendix A of the ASAOC), and the removal action construction contract documents (Contract Documents) (Seattle 2011a).

This RAWP has been prepared jointly by the City and its selected Contractor for the Slip 4 removal action, General Construction Company (GCC, Contractor), of Federal Way, Washington.

1.1 WORK PLAN SCOPE AND ORGANIZATION

The primary purpose of this RAWP is to document the Contractor's proposed means and methods for executing the Work, as set forth in the SOW and the Contract Documents. The RAWP provides detailed and specific designs, procedures, methods, and layouts for accomplishment of the Work. The RAWP also summarizes Contractor's construction quality control (CQC) program and related elements of the City's construction quality assurance (CQA) program.

The RAWP is intended to demonstrate that the proposed means and methods for executing the Work are appropriate and sufficient to achieve the project cleanup goals, are protective of worker health and safety, the public, and the environment, and are consistent with construction Contract Documents and schedule requirements. The RAWP supplements the Contract Documents during execution of the Work; all Work will be conducted in accordance with both the Contract Documents and RAWP, as approved by EPA. The EPA approved CQAP and water quality monitoring plan (WQMP) (Integral 2010b, 2010c) are companion documents to this RAWP and describe City-led activities that will occur during construction to assure the quality of the construction and compliance with environmental requirements. The EPA issued a Clean Water Act (CWA) 401 certification on May 23, 2011 (USEPA 2011), which will also be adhered to during the construction.

This RAWP is organized as follows:

Section 1 - Introduction. Introduction and overview of RAWP organization; Relevant project background and site access information.

Section 2 – Project Overview. Brief overview of removal action objectives and primary removal action elements.

Section 3 - Removal Action Team Organization. Introduction of EPA, City, and Contractor team members. Description of contractor selection process and contractor qualifications.

Section 4 – Contractor Work Plan. Narrative discussion of Contractor's proposed means and methods for carrying out the Work; Detailed description of Contractor's work plans for key elements of the work (e.g., mobilization, dredging, transloading, surveying, waste transport and disposal, capping, etc.); Description of the Contractor's CQC Plan, Field Sampling Plan, and Site Health and Safety Plan; etc. Detailed requirements of the Contractors work plans are contained in Section 01 40 00 of the Specifications (Seattle 2011a).

Section 5 – Construction Quality Assurance. Overview of City's CQA program, including water quality monitoring and performance verification sampling activities; procedures for processing design changes and securing EPA approval of such changes, and; procedures for coordinating with EPA regarding compliance with EPA's Offsite Rule.

Section 6 – Project Schedule. Contractor's detailed project schedule and schedule for developing and submitting other required removal action plans.

Section 7 – References.

Appendices.

As previously noted, the RAWP is intended to satisfy reporting requirements set forth in both the SOW and the Contract Documents. To assist EPA in its review of the RAWP, Table 1-1 lists the minimum topic requirements set forth in the SOW and the corresponding section of the RAWP where these topics are addressed.

1.2 BACKGROUND

The LDW was added to the EPA's National Priorities List (Superfund) in September 2001 because of chemical contaminants in sediments. The key parties involved in the LDW site are the Lower Duwamish Waterway Group (LDWG) (composed of the City of Seattle, King County, the Port of Seattle, and The Boeing Company), EPA, and Washington Department of Ecology (Ecology). EPA is the lead regulatory agency for the sediment investigation and cleanup work under the Comprehensive Environmental Response, Compensation, and Liability Act

(CERCLA); Ecology is the lead regulatory agency for source control work. The LDWG is voluntarily conducting the LDW remedial investigation and feasibility study under an Administrative Order on Consent (AOC).

The City and King County performed the Slip 4 characterization and engineering evaluation /cost analysis under Tasks 9 and 10 of the LDWG AOC and associated SOW, and per requirements of the Slip 4 Revised Work Plan (Integral 2004). In May 2006, EPA issued an Action Memorandum representing its decision for the selected cleanup alternative for Slip 4 (USEPA 2006a). The design, construction, and post construction activities for the removal action in Slip 4 are being conducted as a non-time-critical removal action under an ASAOC and associated SOW (USEPA 2006b).

The design package for the Slip 4 removal action was initially submitted to EPA in February 2007. The design package was subsequently updated and resubmitted in August 2010, to accommodate an approved delay in implementation of the cleanup to allow for completion of source control activities in upland areas that drain stormwater to the site. The final design package comprised a Design Analysis Report (DAR) (Integral 2010a), and supporting design drawings, technical specifications, a construction quality assurance plan (CQAP) (Integral 2010b), a WQMP (Integral 2010c).

A biological assessment has also been prepared for this project (Integral 2007). National Oceanic and Atmospheric Administration and USFWS have completed informal consultation on this project and have not identified any additional conservation measures for endangered species (NOAA 2010; USFWS 2011).

In March 2011 the City issued a public solicitation for contractor bids to perform the work (Work) set forth in the final design package. The bid opening occurred on April 20, 2011, and the City subsequently selected General Construction in accordance with the City's contracting requirements. A construction contract was awarded on May 18, 2011.

1.3 SITE ACCESS AND COORDINATION

The City owns the land on which most of the construction will occur. The City has worked with adjacent landowners and tenants to secure construction access agreements for this project. The affected landowners and tenants include:

- Crowley Marine Services (Crowley) (owner)
    - Organic Fuels Processing (tenant)
    - First student (tenant)

  - Kelly Ryan Marine (tenant)

- First South Properties/Emerald Services (owner)
- The Boeing Company (owner)

Additionally, the City has executed an Interlocal Agreement with the Muckleshoot Indian Tribe (MIT) for coordination of vessel movements and Tribal fishing activities.

The City's resident engineer (RE) will be responsible for coordinating access issues with these affected parties under the terms of the agreements.

2 PROJECT OVERVIEW

2.1 REMOVAL ACTION OBJECTIVES

The primary objective of the removal action is to reduce the concentrations of contaminants in post-cleanup surface sediments (biologically active zone [0–10 cm]) to below the sediment quality standards for polychlorinated biphenyls (PCBs) and other chemicals. The sediment removal action will significantly reduce unacceptable risks to the aquatic environment resulting from potential exposure to contaminants in sediments in the slip. This cleanup will also reduce potential human health risks associated with PCBs in sediment within the LDW.

2.2 REMOVAL ACTION OVERVIEW

The removal actions include a combination of excavating, dredging, and capping of sediments in the slip and in immediately adjacent bank areas; institutional controls; and long-term monitoring to achieve the objectives of the removal action (Figure 2-1). The actions include:

- Removal of contaminated sediments with disposal at an offsite upland commercial disposal facility, followed by capping of remaining sediments, as detailed below:

- Dredge approximately 4,121 cubic yards (yd^3) of contaminated sediment from the head of the slip in Removal Areas 1, 2, 3, and 4. This dredging generally targets the near-surface material with the highest concentrations of contaminants. The target dredge elevation varies in Removal Areas 1, 2 and 3, based on bank slope, and varies between -3 and -6 mean lower low water (MLLW) in Removal Area 4. Please refer to Dredging/Excavation Sections sheets 13, 14 and 15 of the Contract Drawings (Seattle 2011b.) The estimated volume includes a 1.0-foot allowance for over-dredge.

- Excavate approximately 6,134 yd^3 of bank material along the shore of the Slip 4 in Removal Areas 1, 2, 3, and 4. Excavations in Removal Areas 1 and 2 (covering approximately 250 ft of shoreline) will be extended landward to expand intertidal habitat, creating a shallower slope and approximately 0.08 acres of new aquatic habitat from existing uplands. Excavation depth is variable in order to provide slopes ranging in 2-foot horizontal to 1-foot vertical to 3.5:1 horizontal to vertical. Please refer to Dredging/Excavation Sections sheets 13, 14 and 15 of the Contract Drawings (Seattle 2011b.) The estimated volume includes a 1.0-foot allowance for over-excavation.

- Place engineered sediment caps throughout the entire removal action area to physically and chemically isolate contaminated sediments not removed by dredging or excavation. Specific cap configurations have been determined in consideration of federal guidance,

protection of Native American shell fishing treaty rights, and habitat type and functions. All dredged or excavated areas will be capped.

  - Place engineered slope caps on the eastern shore of Slip 4 (Removal Areas 2, 3, and 4) and the western shore (Removal Area 1). Improve conditions of bank areas in preparation for capping (including improving slope stability, removing debris and failing bulkheads, and preparing a subgrade for cap placement). Place slope cover in Removal Areas 4, 5, and 7 for slope stabilization.

  - Also to accommodate these actions, a portion of the existing City pier will be removed from within the removal action area. The approach for the pier removal is discussed in Section 3 of the DAR (Integral 2010a).

- Removal of asphalt, creosote-treated timbers and piles, and other debris present in sediments within the removal action area (estimated 500 tons).

- Sediment accumulations formerly present within the lowest segment of the Georgetown flume (approximately 370 ft of the flume upgradient from the outfall itself) were remediated by the City in 2009 under the ASAOC. Actions for the Georgetown flume are discussed in the DAR (Integral 2010a).

- Implementation of institutional controls will be required because some hazardous substances will remain onsite at levels that do not allow unrestricted use. Section 10 of the DAR presents the objectives and requirements of the Institutional Control Implementation Plan (ICIP).

- Long-term monitoring and reporting to ensure that the site remains protective of human health and the environment.

3 REMOVAL ACTION TEAM ORGANIZATION

This section provides the organizational structure for agency, construction management and oversight, and construction contractor personnel responsible for implementation of the Slip 4 removal action. The project team titles and organization structure are consistent with Slip 4 CQAP (Integral 2010b) and have been updated as needed. Project team organization charts are presented in Figures 3-1 and 3-2. Note that certain project team members may be responsible for more than one role. Table 3-1 contains project team contact information which will be updated as needed throughout the course of the project.

3.1 AGENCY PERSONNEL

The EPA is the regulatory authority and responsible agency for overseeing and authorizing the removal action.

Remedial Project Manager – Karen Keeley, EPA Region 10

The Remedial Project Manager (RPM) is responsible for overseeing the removal action to ensure that the remedy is protective of human health and the environment and to ensure that the removal action is implemented in accordance with the SOW.

Agency Water Quality Manager – Erika Hoffman, EPA Region 10

The Agency Water Quality Manager provides support to the RPM from the EPA Environmental Review and Sediment Management Unit, serves as the agency water quality monitoring contact, and makes technical decisions regarding water quality monitoring results and response actions.

Agency Construction Oversight Manager – Amy Dahl, TechLaw, Inc.

The Agency Construction Oversight Manager (ACOM) is responsible for ensuring that the construction activities comply with the SOW, design drawings and specifications, and approved RAWP.

3.2 CONSTRUCTION MANAGEMENT AND OVERSIGHT PERSONNEL

The removal action construction will be managed by the City, overseen by the City's Construction Oversight Manager (COM), and executed by the Contractor. Responsibilities of key personnel are summarized below; refer to the CQAP (Integral 2010b) for detailed descriptions of responsibilities.

City Project Specifier – David Schuchardt, P.E., Seattle Public Utilities

The City Project Specifier (PS) has overall responsibility for coordinating the removal action activities and ensuring that all Work is conducted in accordance with the EPA approved final design, as amended. The PS is the primary point of contact for EPA.

City Project Manager – Chris Woelfel, Seattle Public Utilities

The City Project Manager (PM) takes direction from the City PS, and is responsible for internal City coordination of contracting and construction management. The PM is also the primary City point of contact for the public.

City Supervising Construction Manager – John Summers, P.E., Seattle Public Utilities

The City Supervising Construction Manager (SCM) is the City's Construction Management lead and will supervise the City RE to ensure the Work is administered and performed in accordance with the Contract Documents.

City Resident Engineer – Cynthia Blazina, P.E., Seattle Public Utilities

The City RE is responsible for the onsite aspects of construction management. The RE will be the City's primary point of contact for the Contractor on site.

City Oversight Contract Manager – Jennie Goldberg, Seattle City Light

The City Oversight Contract Manager will manage the contract, schedule, budget, and project deliverables for removal action oversight services provided by Integral Consulting Inc. (Integral). The City Oversight Contract Manager will also prepare the Monthly Progress Reports to EPA.

City Construction Oversight Manager / Quality Assurance Officer – John Lally, P.E., Integral Consulting Inc. (On-Call Consultant)

The City's COM and Quality Assurance Officer (QAO) provides oversight and management of construction activities and the CQA program during construction of the removal actions. The COM/QAO is Integral's primary contact for the City. The COM/QAO will work directly with the City RE and PS.

Field Supervisor / Site Safety Officer – Eric Pilcher, P.E., Integral Consulting Inc.

The Field Supervisor reports to the COM/QAO and is responsible for implementing the sampling and analysis work in the WQMP, sampling and analysis plan, and quality assurance project plan (QAPP). The Field Supervisor will also serve as Integral's Site Safety Officer and will implement and oversee the health and safety program for Integral personnel associated with completing the oversight activities.

Analytical Quality Assurance Officer – Kim Magruder-Carlton, Integral Consulting Inc.

The Analytical Quality Assurance Officer reports to the COM/QAO and is responsible for analytical laboratory coordination and data validation and evaluation.

Analytical Laboratory Services – Analytical Resources, Inc. of Tukwila, Washington

The analytical laboratory performs sediment and water analyses for sampling conducted by Integral (under the direction of the COM/QAO).

The contractor is also responsible for certain analytical requirements, and will employ an accredited laboratory as a subcontractor, as described in Section 2.3.7 of the CQAP.

Designers – Integral Consulting Inc.

The construction activities are supported by the Design Project Manager (David Schuchardt, P.E., formerly of Integral) and Integral Consulting Inc. They are available to provide input on the intent of the drawings and specifications and support changes to the design, as necessary.

Alternates

Alternates for field staff will be provided in the event of absences (planned or unplanned) of site personnel.

Consultants

During the course of construction, task-specific consultants may be used to ensure that the design objectives are realized and that the project is constructed in accordance with the contract drawings and specifications. Each consultant will have a project manager who will interface with the COM/QAO and the City's PM in carrying out their responsibilities.

3.3 CONSTRUCTION CONTRACTOR

3.3.1 Contractor Selection

The contractor was selected through an open public bid process. This included the following dates and activities:

- Advertisement for Bids March 30, 2011
- Pre-bid Site Walkthroughs April 5 & 7, 2011
- Issuance of Bid Addendums April 12, 15 & 18, 2011
- Opening of Bids April 20, 2011
- Receipt of Qualifications May 11, 2011
- Contract Awarded May 18, 2011
- Notice to Proceed given by City June 9, 2011

3.3.2 Contractor Personnel

The Contractor performs the removal construction activities, including pier demolition, removal of piles and debris, dredging, disposal of dredged sediments, placement of the sediment cap, placement of outfall scour protection, and (potentially) extension or modification of private stormwater outfalls. Contact information for Contractor personnel, including sub-contractors is provided in Table 3-1. This list will be updated as needed throughout the course of Removal Action construction.

Contractor Project Manager - Tom Jirava, General Construction Company

The Contractor's Project Manager (CPM) provides management of and direction to the project Contractor personnel assigned to the construction project site.

Contractor Site Supervisor - Matthew Miller, General Construction Company

The Contractor Site Supervisor provides onsite management of and direction to the Contractor personnel, including craft labor and subcontractors and is responsible for executing the work in full compliance with the contract drawings and specifications.

Contractor Quality Control Representative - Tom Jirava, General Construction Company

The Contractor Quality Control Representative (CQCR) is responsible for implementation and maintenance of the CQC Plan.

Contractor Site Engineer - Tyler Waugh, General Construction Company

The Contractor Site Engineer is responsible for the daily performance of field CQC activities in support of the project.

Contractor Site Safety and Health Officer / Project Safety Manager - Ryan Gammons, General Construction Company

The Contractor Site Safety and Health Officer / Project Safety Manager is responsible for the implementation of the construction team's health and safety programs and procedures.

Other Contractor Personnel

Other site personnel (craft labor) may be added by the Contractor if necessary.

Subcontractors

Sub-contractors that will be involved in the Removal Action and CQC activities are listed below. Other sub-contractors may be added by the Contractor if necessary. In the event that the Contractor intends to introduce a new sub-contractor, this RAWP will be revised to describe the sub-contractor's specific duties and demonstrate that they meet training and certifications as required by the Contract Documents. All sub-contractors must meet the approval of the City and EPA. Subcontractors are responsible to the prime Contractor for the quality of their work, protection of the environment, and the health and safety of their personnel.

Key subcontractors include:

- **Demolition Supervisor, Gil Olson, Rhine Demolition**
- **Transloading Operations Manager, Jonathan Hall, Lafarge North America**
- **Transport and Disposal Manager, Leslie Whiteman, Allied Waste**
- **Field Sampling Lead, Suzanne Dudziak, Greylock Consulting**
- **Independent Professional Land Surveyor – Gary Chapman, AES / Mel Saunders, eTrac Engineering, LLC**

  The independent Professional Land Surveyor (PLS) is a subcontractor for key surveying tasks that will be used for calculation of payment quantities, acceptance of the work (dredging and capping), and preparation of record drawings. The independent surveyor is a PLS, licensed in the state of Washington, with an American Congress of Surveying and Mapping (ACSM) Hydrographer Certification for hydrographic survey work.

- **Analytical Laboratory – Analytical Resources, Inc.**

  The Contractor will use an analytical laboratory for certain testing requirements. The Contractor's Analytical Laboratory is listed in the National Environmental Laboratory Accreditation Program (NELAP).

3.3.3 Contractor Qualifications

All onsite Contractor and subcontractor personnel are required to have current health and safety training required by the Occupational Safety and Health Administration 29 Code of Federal Regulations (CFR) Part 1910 and the Washington State Department of Labor and Industries (Chapter 296-2 Washington Administrative Code, Subpart P, Hazardous Waste Operations and Emergency Response (HAZWOPER)), including onsite training.

4 CONTRACTOR WORK PLAN

The following sub-sections have been provided by General Construction Company (GCC), demonstrating their understanding of the Contract Documents. The provided information does not supersede or absolve the Contractor from meeting the full RAWP reporting requirements set forth in the Contract Documents.

4.1 PROJECT WORK PLAN

4.1.1 Contractor Means and Methods

The first phase will involve dredging and excavating approximately 16,000 tons of non-hazardous, contaminated material, as categorized by Washington State dangerous waste regulations. Material will be removed using a 75-ton derrick barge equipped with a clamshell bucket and an excavator and loader. The excavator and loader will concentrate on material unreachable by the derrick. Material will be stockpiled in a lined containment area on land where it will be reachable by the derrick barge. The derrick barge will load dredge spoils into a custom outfitted dredge material barge that will not allow sediments to be discharged back into the waterway. See Attachment A4.4-2 for the configuration of the dredge material barge. The stockpiled material will also be transferred to the drain barge by the derrick. Once loaded, the barges will be towed down river to a transloading facility operated by Lafarge. Here, the material will be offloaded into a contained vault capable of holding 8,000 tons of material and will then be loaded into lined containers by an excavator. See Attachment A4.1-4 for a picture of the lined container. Once a container is full, it will be weighed, loaded onto a railcar, and sent to Roosevelt, WA to be disposed of at Regional Disposal Company's subtitle "D" landfill. The containers will not be covered prior to being transported. See Attachment A4.1-9 for a letter from Allied Waste confirming that the containers do not need to be covered.

The second phase will be pier demolition, directly following the completion of dredging and excavating. GCC will work with the demolition subcontractor, Rhine, and will assist them by setting up debris platforms under the pier to keep concrete from falling into the water. Rhine will remove precast panels and concrete caps, leaving the concrete piles to be removed by GCC using hydraulic shears. Concrete piles will be handed off to Rhine. All concrete and rebar will be processed onsite, loaded into demolition boxes and hauled to a nearby recycling facility. Creosote timber fender piling and any other treated lumber removed during demolition will be taken to a landfill for disposal.

The third phase will involve placement of approximately 46,000 tons of backfill material which will be placed using both the derrick barge and excavator. The derrick barge will use a

combination of a rock box and a clamshell bucket to place material. A wheel loader, on deck of the material barge, will be used to load the rock box and feed the clamshell bucket.

All operations above are explained in further detail within the specified plan related to the work. Please refer to the schedule (Attachment A4.1-3) for approximate dates of construction activities.

4.1.2 Project BMPs

Best management practices (BMPs) to reduce the short-term environmental effects of this project are specified in the Contract documents (plans and specifications), and have been summarized in a Biological Assessment for the project (Integral 2007) and in a U.S. Fish and Wildlife Service (USFWS) consultation letter (USFWS 2011). BMPs specific to GCC's construction approaches are discussed in the RAWP sections describing the work elements (e.g., capping, dredging) and are summarized in detail in Section 4.10, Environmental Pollution Control Plan.

4.1.3 Temporary Facilities, Staging, and Access

The project site plan, showing temporary facilities, staging, and access, is shown in Attachment A4.1-1. All temporary facilities and controls will be in compliance with Specification Section 01 50 00.

Job Offices, Parking, and Security Fence

GCC will use Staging Area C from September 15, 2011 to March 1, 2012. Some activities, such as setting up the tide gauge, will need to occur prior to September 15, but these activities will not affect the tenants' operations. In the middle of September when mobilization begins, GCC will first install a temporary security fence around Staging Area C (see Attachment A4.1-2 for fence specifications and suppliers). On the north and south sides of the staging area, GCC will install rolling access gates for vehicle ingress and egress. During non-working times when no personnel are at the jobsite, the access gates will remain locked. Two office trailers for the City and GCC will be located on the west side of Area C and will have all the accommodations required by Specification Section 01 52 13. Garbage and recycling dumpsters will be located adjacent to the job offices and emptied as needed. Approximately 16 parking spaces will be available along the west side of Staging Area C. Parking spaces will be provided for GCC, City, and EPA employees and GCC Subcontractors. Bathrooms and wash stations for employee use will be located inside or adjacent to the offices. GCC and its subcontractors will not park personal vehicles out of the staging areas. No existing parking along 8th Ave will be affected by construction.

Equipment and Material Storage

During non-working hours, equipment and materials will be stored inside the fence-enclosed staging area. The GCC dry shack and tool connex will be locked during non-working hours.

Haul Roads

Truck and vehicular traffic entering and leaving the site will use the pre-defined haul routes shown on sheet 7 of the contract drawings, and described in the traffic control plan, Section 4.7. Upon mobilization, a gravel haul road will be built on the northwest side of the site in Staging Area B, which will be used for equipment traveling along the bank of the slip. Another haul route will be established along the top of the bank on the east side of the slip in Staging are A, which will be used by equipment traveling along the top of the slope during excavation and capping activities. Attachment A4.1-6 shows section views of the stages in which the haul road on the west bank will be built. The haul road on the east side will be on the asphalt with filter fabric and wattle to keep any material contained in case there is a spill. The filter fabric will be standard 8-oz non-woven fabric. A picture of the fabric is shown in Attachment A4.1-8. The fabric and wattles will be pinned down to the asphalt to prevent any bunching when trucks and equipment travel over it. Additional detail on how the haul road will be constructed is described in Section 4.4.2. Each haul road will be maintained to ensure that they function as intended and the fabric is protected.

Truck Washout

The Loader, Dump Truck and Excavator that come into contact with the contaminated soils will be decontaminated in a portable containment berm measuring 20′ x 50′ with two foot side walls before they leave the exclusion zone. The setup is shown in Attachment A4.1-5. The equipment will be washed off with a pressure washer inside the containment berm. Water collected in the containment will be pumped into a baker tank to be treated. Sediment remaining in the containment berm will be swept/scooped/wiped up and disposed of with the other dredged and excavated material. Upon removal of residual sediment, the containment berm will be rinsed down. The wash water will similarly be collected in a low spot and pumped to the baker tank.

The same containment berm will be set up two times. Once on the West side of the Slip and once on the East side of the Slip. After being used on the West side GCC will decontaminate the containment berm, fold it up and transport it over to the East side to be used. Once GCC is done using the containment berm it will be loaded onto the barge and taken to Lafarge to be disposed of at Roosevelt Regional Landfill. Stockpiles

The site will have two designated stockpiles for storing excavated material. One stockpile will be located on the north end of the existing pier during excavation operations. Another stockpile will be located on the southeast side of the slip during excavation along the east bank. The stockpiles will be contained by a system of ecology blocks, heavy duty Visqueen, steel street

plates, and a dewatering pump. See Attachment A4.4-4 for a sketch of the stockpile. Stockpiles will be covered during non-work periods, and whenever they are not being regularly used. For instance if the stockpile is not being used for half of the day it will remain covered. If wind threatens to transport stockpiled materials, the stockpiles will be covered immediately.

Land Access Areas

All drains and catch basins in GCC's work areas will have filter socks installed in case of accidental material spillage, tracking, or water runoff leaving the stockpile. These stormwater system BMPs are described in Section 4.10.

Water Access

Water access will be established just south of the existing pier. The access will consist of a gangway going down to a float which allows the float to rise and ebb with the tide. Workers will travel between the access float and derrick barge between work skiffs. A picture of a previous water access gangway system is shown in Attachment A4.1-7.

Disposal Facilities

Table 4-1 below shows all of the disposal facilities for the project including the addresses, disposal type, quantity, and EPA ID#.

Subcontractors

A list of subcontractors GCC will be working with is shown below.

Rhine – Demolition

Allied Waste/Lafarge – Disposal and transloading

Greylock Consulting – Import Material Testing

BC Traffic – Traffic Control

eTrac Engineering – Surveying

Changes

Changes to the temporary facilities and site plan will be brought to the attention of the RE for approval and updated on the site plan drawings as necessary.

Table 4-1. Disposal Facilities.

Waste/Recycle Type	Description	Quantity	Proposed Disposal/Recycle Location	Facility Type	Address	Phone Number	EPA ID #
Fender Piling	50' Creosote Treated Timber Piling	46 EA	Roosevelt Regional Landfill	Subtitle D Landfill	500 Roosevelt Grade Road, Roosevelt, WA 99356	(509) 384-5641	20-001
Creosote Timbers	Creosote Timbers, Bulkheads, Derelict Piling, Crane Structure	100 TN	Roosevelt Regional Landfill	Subtitle D Landfill	500 Roosevelt Grade Road, Roosevelt, WA 99356	(509) 384-5641	20-001
Upland Greenery	Bushes, Trees, Root Wads, on upland banks	10 TN	Roosevelt Regional Landfill	Subtitle D Landfill	500 Roosevelt Grade Road, Roosevelt, WA 99356	(509) 384-5641	20-001
Dredge Material	Dredge material, debris, used filter fabric, and visquine, used haul road materials, upland bank material, used PPE, filter material from barges	10,200 CY	Roosevelt Regional Landfill	Subtitle D Landfill	500 Roosevelt Grade Road, Roosevelt, WA 99356	(509) 384-5641	20-001
Concrete	Pier Deck, Concrete Piling	1400 CY	C R Not Certified	Recyling	13001 Martin Luther King Jr Way, Seattle, WA 98178	(206) 772-6837	N/A
			Stoneway Concrete Recycling	Recyling	510 Monster Rd. South, Renton, WA 98005	(425) 226-1000	N/A
			JEV Concrete Recycling	Recyling	6524 240th St. SE, Woodinville, WA 98072	(425) 487-9449	N/A
			WM Diskson Co.	Recyling	2839 48th Street East, Tacoma, WA 98443	(253) 922-3296	N/A
Steel	Rebar and Miscellaneous Steel, crane rail	75 TN	Schnitzer Steel	Recycling/Salvage	1902 Marine View Drive, Tacoma, WA 98422	(253)-572-4000	N/A
			Not Certified	Recycling/Salvage	601 South Myrtle Street, Seattle, WA 98108	(206) 682-0040	N/A
Wastewater	Wastewater from decon and Stockpiles	1000 GAL	Marine Vacuum Services, Inc.	Water Treatment	P.O. Box 24263 Seattle, WA 98124	(206) 762-0240	N/A

4.1.4 Offsite Staging and Transloading

Refer to RAWP Section 4.3 Transportation and Disposal Plan for GCC's offsite staging and transloading plan.

4.1.5 Project Schedule

For a copy of the project schedule see Attachment A4.1-3.

4.2 DEMOLITION PLAN

The demolition plan is provided in accordance with Specification Section 02 41 13. This work plan identifies the proposed methods, equipment, and operating sequences to be used in performance of the demolition, removal work, and handling of demolition materials.

GCC will be teaming with Rhine for the demolition and disposal of the 445 × 42 foot pier that is currently connected to the Crowley pier. The pier for demolition and disposal is made up of (23 ea) bents. Each bent consists of a 42-foot long cast in place concrete cap that sits on (7 ea) 16-inch diameter octagonal concrete piles. Spanning the bents are (7 ea) 20 × 6 foot precast deck panels. The existing pier's bulkhead is to remain, along with the sheet pile wall, waler beam, and tie-backs. Along the face of the pier are timber fender piles approximately 10 feet on center, a header beam lays atop of the piles and is connected to a 12 × 12 inch timber bullrail that runs the full length of the pier and wraps the side.

4.2.1 Pre-Demo Activities

Prior to starting pier demolition, GCC will submit a Conditions Documentations Memo containing photographic and narrative documentation of existing conditions of the pier structure and surrounding areas, as specified in Section 02 41 13.

GCC will coordinate with City's RE so that Crowley will be contacted and advised of pier demolition in advance of the start date, allowing Crowley enough time to properly disconnect and relocate the electrical and mechanical utilities under the pier. GCC will confirm operations have been completed through the RE, unless otherwise directed.

GCC will provide warning signage along all areas of demo operations. Trucking routes and areas with operated equipment will be demarcated. Delineators and caution tape will be used as needed to warn people about areas of potential danger. GCC will also provide proper protection for all persons in the vicinity of demolition work along with protection for adjacent structures and equipment. Protection devices and procedures shall be discussed with the City and adjacent property tenants during a preconstruction walkthrough.

Structure and Property Protection

All craft and personnel will be advised of the structures and equipment in and around GCC's work area. Structures may be marked with high visibility tape and flags. All operations in close proximity to structures and equipment will require a spotter to guide the operator and give clearance feedback.

4.2.2 Means and Methods

Bulkheads (on bank areas where excavation is specified) will be removed during dredging and excavation, which will eliminate possible hillside sloughing into the waterway. Fender piles and all reachable miscellaneous timber piles will be extracted prior to pier demolition. All other piles will be dead pulled during dredging operations. Piles that break during extraction and are above mudline will be cut down to design depth with clamshell bucket. Debris and miscellaneous rubble accumulated at the head of the slip will be removed by clamshell bucket during dredging. If items removed need to be cut down in size for disposal purposes, it will be done onboard the dredge barge.

GCC will use the DB Columbia (see Attachment A4.6-1) equipped with an American Piledriving Equipment vibratory hammer (see Attachment A4.2-2) to remove all the timber fender piles prior to pier demolition. GCC will extract the piles one-by-one and hand them off to Rhine's land-based excavator with a grapple attachment (see Attachment A4.2-3.) Timber fender piles will be temporarily placed on the pier. Proper containment and Visqueen lining will be used as needed to process the piles into required sizes for transport and disposal. Rhine will remove the timber bullrail and miscellaneous pier hardware while timber piles are being processed. The processed piles, bullrail, and miscellaneous pier hardware will be loaded into a demolition box and transported by truck to Allied Waste's facility. The material will be loaded onto rail cars and disposed of upland at Roosevelt Regional Landfill, Roosevelt, WA. Demolition of the pier will begin at the southern end and work northward. GCC will mobilize an additional derrick barge to assist with pier demolition activities. Marine demo equipment mobilization will follow the completion of capping at RA3.

Prior to beginning physical dock demolition, GCC will erect catch platforms under the pier to catch debris from falling into the water during operations (see Attachment A4.2-4). Rhine and GCC plan to demo (4 ea) bents at a time. These platforms will catch concrete spalls and fragments that fall from the deck and cap demo operations. Most of the debris that falls will be handled with brooms and shovels. This material will be placed in skip boxes that will be emptied into trucks hauling concrete to the recycling facility. In cases where large pieces fall on the platforms that are too heavy to handle by hand, Rhine will use their long reach excavator and pick the piece up with the bucket and thumb. These platforms serve as a secondary containment. Rhine will be using a U-shaped catch box for most of the demolition process which should catch a majority of the falling concrete (see Attachment A4.2-3).

Rhine and GCC plan to demo (4 ea) bents at a time. The number of bents available for demolition will be driven by the available floats used as debris platforms. Rhine will break out closure pours at each bent using a combination of an excavator-mounted hydraulic breaker, rock drills, and chipping guns. Once the closure pour is removed at both bents, the precast deck panels will be peeled back and transferred to the demolition processing area at the North end of the pier. Once all the deck panels have been removed, GCC will secure rigging to the cap and

only the cast in place concrete caps will remain. The rigging will be attached to the hoist line on the derrick barge *Columbia*. Rhine will use an excavator with hydraulic shears to cut the cap free from the concrete piles. Once the cap is free, the *Columbia* will swing the cap over and place it onshore for Rhine to process and dispose. After removal of all the deck panels and caps is complete, GCC will mobilize Coastal Pile Cutters' hydraulic cutting shear (see Attachment A4.2-5), which is specifically designed for concrete pile cutting and allows for faster, cleaner, and safer removal of concrete piles. GCC will hoist the pile shear with the *Columbia* and position it so that the pile is completely engulfed in the throat of the shear. Once the gate is closed on the shear, it will be lowered down to the mud line. Rhine will hold the concrete pile with a long reach grapple. Once the hydraulic shear has cut the pile, Rhine will lift the pile up and placed it on the dock. From here another excavator will grab and process the pile. The pile will then be loaded into either demolition boxes or dump trucks and transferred to a recycling facility. This same process will be repeated, working (4 ea) bents at a time, using the same demo sequence, until the dock is completely demolished. During this period Rhine will coordinate and schedule trucking of disposal and recycling material in efforts to minimize interference with surrounding businesses.

All processed pier concrete pieces will be contained. Rhine will provide continual maintenance to contain all broken concrete. Material will be swept into piles, depending on particle size and will be loaded into demo boxes to be hauled to the recycling facility. In the event of rain, slurry vacuums may be used to vacuum potential concrete slurry. Having to remove attached soil from concrete is not planned. All concrete being removed is above mudline.

4.2.3 Key Personnel and Supervision

Project Sponsor	Tom Coultas	360-340-0932
Project Manager	Tom Jirava	253-606-6548
Project Superintendent	Matthew Miller	206-510-6554
Project Engineer	Tyler Waugh	253-306-3397
Rhine Demolition Supervisor	Gil Olson	253-606-4806

4.2.4 Schedule/Hours of Work

Demolition will begin following completion of capping in RA3. The Demolition operations are currently planned as single 8-hour shifts, Monday through Friday. The typical work shift is from 7:00am – 3:30pm, but the 8-hour window can vary as long as it is between the 6:00am – 6:00pm window. Demolition activities will be scheduled to accommodate the permitted in-water work period. Shift start times and hours of work may vary due to tides and other project constraints.

4.2.5 Demolition Disposal and Salvage

Rhine intends to salvage and recycle to the greatest extent possible. All non-contaminated items, not otherwise specified as salvage for the City, shall become the property of Rhine. Creosote piling will be disposed of at a landfill and will not be salvaged or recycled. Rhine may salvage non-creosote timbers depending on their condition. GCC and Rhine plan on adhering to the goal per Section 01 74 19 – 1.07 Waste Management Goals B "Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. For construction debris, waste disposal in landfills shall be minimized."

Disposal and Recycle Locations

- Concrete and Asphalt Recycling:
  - Stoneway, Seattle, Washington
  - Joeseph Anderson, Seattle Washington
  - JEV Recycling, Woodinville, Washington
  - WM Dickson Co., Tacoma, Washington

- Iron & Metal:
  - Schnitzer Steel, Tacoma, Washington.
  - Seattle Iron & Metals, Seattle, Washington

All material taken to the above locations will be transported by semi-end dump trucks.

- General Debris:
  - Roosevelt Regional Landfill via lined rail containers, filled onsite and transported by truck to the Allied Waste rail facility.

4.3 TRANSPORTATION AND DISPOSAL PLAN

GCC will dispose of all wastes generated during the course of the project in accordance with all applicable local, state, and federal regulations. All disposal of hazardous and nonhazardous waste shall be conducted in compliance with the CERCLA Off-Site Policy. GCC and the City of Seattle will comply with specifically paragraph 21 of the Administrative Settlement Agreement and Order on Consent for Removal Action (ASAOC) effective September 28, 2006. A list of all waste materials and proposed disposal facilities is provided in Table 4-1.

The dredge spoils removed from Slip 4 have been characterized based on pre-design sampling provided by the City of Seattle. See Attachment A4.3-9 for a copy of the signed waste profile sheet.

4.3.1 Generated Wastes

Dredge and Excavation Spoils

Dredge and Excavation spoils will be loaded onto GCC's material barges and taken to the Lafarge transloading facility. See Attachment A4.3-1 for the Dredge Material Handling Plan prepared by Lafarge. When Lafarge loads containers they will not be covered while being transported to Roosevelt Regional Landfill.

The following calculations demonstrate that the rail cars will have plenty of freeboard and will not need to be covered.

The containers will be loaded to a maximum weight of 30 TN.

The minimum material density is 1.25 TN/CY.

The maximum volume per container is 24 CY (= 30 TN / 1.25 TN/CY).

The inside dimensions on a 20-foot open top container are 19′-4″ long x 7′-7″ wide and 7′-8″ high. The cross sectional area of each container is 16.28 SY (= 19.33 ft x 7.58 ft / 9 SF/SY).

The maximum depth of dredged material is 4′-5″ (= 24 CY / 16.28 SY x 3 ft/yd).

Therefore, the minimum freeboard is 3′-3′′ (= 7′-8″ – 4′-5″).

Photo Documentation will be provided for the first few rail cars to illustrate that there will be plenty of freeboard in the containers.

Timber Piling/Bulkheads

The timber fender piling will be removed and placed upland. Any pilings that break off during extraction will be cut off at the mudline. Rhine will cut the fender piling into pieces and dispose of them. They will be taken to Allied Waste's facility in Seattle on 3rd Ave. and Lander St. (See Attachment A4.3-8) where they will then be loaded onto rail cars and taken to Roosevelt Regional Landfill. Other treated timbers and bulkhead pieces will be loaded onto the material barge and taken to the Lafarge transloading facility for disposal.

The reason the fender piling will be placed upland is a matter of convenience. It is more efficient to pull the piles with the hammer and place them on the pier than it is to set them on the barge, since the piling are right next to the pier. The other miscellaneous piling, bulkheads, and debris will be easier to place on the material barge because in most cases the crane will be too far away from the pier to set the debris on the pier.

Concrete and Asphalt Pier Decking

Concrete and asphalt removed from the pier deck will be stockpiled onsite and then trucked to an approved disposal/recycling plant as described in Section 4.2 Demolition.

Concrete Piling

Concrete piling will be cut-off by GCC and placed onshore. Rhine will break up the piling and truck the concrete and steel to appropriate recycling locations as described in Section 4.2 Demolition.

Garbage

Garbage and waste generated by the Contractor will be contained in bins onsite and emptied as needed.

4.3.2 Proposed Disposal and Recycling Facilities

Dredge Material

See Attachment A4.3-1 of this section for the proposed dredge disposal facility information. Lafarge will be transloading the dredged and excavated material. All employees handling the sediment at Lafarge will be HAZWOPER trained and certification will be kept on site. Lafarge is currently revising their Health and Safety Plan to reflect site-specific practices for this project.

Solid Waste Tracking Sheet (Bill of Lading)

See Attachment A4.3-2 for a sample Bill of Lading for materials determined to be a non-hazardous and non-dangerous waste.

Onsite Management Practices

BMPs for handling the material are described in detail in the Lafarge Dredge Material Handling Plan (see Attachment A4.3-1). The spill prevention control and countermeasures (SPCC) plan in Section 4.10 of this RAWP describes onsite management practices for handling non-hazardous and hazardous wastes, inventory controls, and waste minimization methods.

Onsite, Offsite, Treatment, Storage, and Disposal Methods and Facilities

Refer to Attachment A4.3-1 for treatment, storage, and disposal methods to be provided by Lafarge while handling the dredge spoils. Material will be taken from the Lafarge transloading site and delivered to the Roosevelt Regional Landfill via Burlington Northern Santa Fe (BNSF) railroad. Refer to Attachment A4.3-3 for the BNSF Emergency Response Plan.

Offsite Disposal Documentation

Refer to Attachment A4.3-4 for copies of the Roosevelt Regional Landfill permits for disposal of dredge spoils. Refer to Attachment A4.3-5 for a sample Certification of Disposal Form for the disposal of the dredge spoils at Roosevelt Regional Landfill.

"Cradle-to-Grave" Procedures for Waste Documentation

Each type of material taken offsite for disposal will be tracked by GCC. This is very important for determining correct quantities.

Dredge spoils and excavated material will be loaded onto barges and tonnage will be calculated by barge measure. After the material has been transloaded and disposed of at the disposal site, barge measure calculations will be compared to the scale weights at the disposal site. All disposal tickets will be kept on record and submitted to the RE.

Creosote piling and lumber will be loaded into containers onsite and taken to a disposal facility. Truck tickets, including weight and disposal date, will be given to GCC by the disposal facility.

Concrete Piling and pier deck concrete will be broken down and loaded into containers to take to the recycling facility. Disposal tickets will be given to GCC for each load.

Reinforcing steel taken from the concrete deck and piling will be separated from the concrete and taken to a steel recycling facility. The recycler will provide a disposal ticket for each load taken to the recycler.

Subcontractors

Lafarge will transload all of the dredged and excavated materials at their transloading facility on the Duwamish Waterway. See Attachment A4.3-1 for the equipment they will use during transloading operations. The material will be loaded into 8′ × 20-foot containers that then will be loaded onto rail cars to be transported to the disposal facility in Roosevelt, WA.

Allied Waste will provide Lafarge with the 8 × 20-foot containers to load to dredge material into. Allied Waste will then coordinate with BNSF Railroad for transporting containers to the Roosevelt Regional Landfill.

Rhine will load demolition debris and creosote piling into trucks and trailers onsite and take the material to their designated disposal facilities. See table 4-1 for the list of designated disposal facilities.

Photo Documentation will be provided for the first few rail cars to illustrate that there will be plenty of freeboard in the containers.

Additional Photo Documentation will also be provided for the same first few rail cars upon their arrival at the Roosevelt Regional Landfill, to illustrate that there was no spillage from the containers during rail transport.

Traffic Control

See Section 4.7 of this RAWP for a description of the Traffic Control System to be employed by GCC.

Waste Disposal Permits

See Attachment A4.3-4 for the Waste Disposal and Landfill Permits

Haul Routes

Refer to Attachment A4.4-3 for the dredge disposal haul route. The dredge material barge will be towed from the Slip 4 jobsite to the Lafarge transloading facility. Demolition debris disposal will be taken offsite via 8th Avenue S. and then East Marginal Way. Debris will be trucked to various locations, but GCC does not anticipate any substantial traffic impacts because of the low number of trucks entering and leaving the jobsite.

Sampling and Analysis of Disposal Material

GCC does not anticipate the need for additional sampling of materials being taken to disposal facilities at this time. If any additional testing does become required, GCC will comply with all regulations and requirements defined by the designated disposal facility or the RE.

Packaging Labeling and Manifesting Waste Streams

All dredged and excavated material taken to Lafarge will be tracked at their facility. Each container loaded with material has a unique 11-digit identification number, consisting of 4 letters and 7 numbers. These numbers will be recorded by Lafarge when they are loaded onto the rail cars. When the containers get to the Roosevelt Regional Landfill the identification numbers will be recorded at the time the material is deposited into the landfill.

Containers, Liners, Inspection Procedures, and Spill/Leak Prevention

Dredged and excavated material will be loaded into 8 × 8 × 20-foot railcar containers. The containers have an identification number consisting of four letters and seven numbers (for example, TOLU 425338 7). Before material is loaded into containers, a 12-mil plastic liner will be put in the container, which will prevent any water from leaking out of the container. Before the container is lined, it will be checked for defects. After the container is loaded, Lafarge will ensure that no water or material is leaking out of the container.

Trucking and Barging Hours of Operation

None of the dredged and excavated material will be taken away by trucks. All containers filled with material will be loaded directly onto railcars at the Lafarge transloading facility. GCC anticipates that, at the most, one barge will leave the site daily during dredging operations.

Demolition concrete and steel debris will be loaded into demolition boxes at Slip 4 and then trucked offsite to the recycling location. GCC estimates approximately 10 to 15 trucks will enter and leave the site daily during demolition operations. GCC realizes that traffic along 8th Avenue can be very congested with bus traffic in the morning and afternoon. Therefore, GCC intends to truck out material during the lower traffic times throughout the day as much as practical. See Section 4.7 Traffic Control Plan for more details on truck traffic.

Although most capping material will be barged in and placed with a derrick, some of the capping material for bank areas will be trucked to the jobsite and placed with a backhoe. GCC anticipates approximately 10 to 15 trucks per day during this operation. This low volume of traffic should not have a noticeable impact on the general public and adjacent property owners. See 4.7 Traffic Control Plan for more details on truck traffic.

4.4 DREDGING AND EXCAVATION PLAN

This plan has been prepared in accordance with Specification Section 35 20 23 – Dredging and Excavation. This plan describes the planned approaches, equipment, means and methods for accomplishing the dredging and excavation, handling, and transloading of materials. Operations are scheduled to begin October 3, 2011.

4.4.1 Project Description

Slip 4 removal actions include a combination of excavating, dredging, and capping of sediments in the slip and immediately adjacent bank areas; institutional controls; and long-term monitoring to achieve the objectives of the removal action. The actions include:

- Dredging contaminated sediment from the head of the slip. This dredging generally targets the near-surface material with the highest concentrations of contaminants.
- Dredging and excavating bank material along the shore of the Slip 4 in RA2, RA 3, RA4, and RA5. Cuts in RA2 and RA3 will be extended landward to expand intertidal habitat, creating a shallower slope and approximately 0.08 acres of new aquatic habitat from existing uplands.
- Removal of asphalt, creosote-treated timbers and piles, and other debris present in sediments within the removal action area.

Of the anticipated 10,200 yd^3 of the dredge and excavation spoils 100 percent will be transported down river via barge to the Lafarge transloading facility, located next to Kellogg Island. Here, the material will be transloaded from the barge to a containment vault, where it will then be loaded into lined containers. The loaded containers will be placed onto rail cars at the facility and transported straight to the upland subtitle "D" landfill in Roosevelt, WA.

4.4.2 Work Sequence

The project will begin with setting up material barges to control and manage retained water from dredge spoils. Site BMP's will be deployed prior to the start of work. For further detail of BMP's please see Section 4.10, Environmental Pollution Control Plan. GCC will saw cut the new top of slope line and will use vacuums to catch all slurry during saw cutting. These vacuums are specifically design to suck up slurry. See Attachment A4.2-6 for a sample picture of a slurry vacuum. Slurry shall be properly disposed of by GCC. The concrete and asphalt cut shall stay in place until it is removed by upland excavation operations.

GCC will begin dredging operations by removing as many timber piles and structures as possible. By using high tides, GCC plans on getting in close enough to the shoreline to remove a majority of the timber piles by dead pulling them with the clamshell bucket. It is GCC's intention to fully remove piles that have not rotted. After all the reachable timber debris has

been removed, dredging will begin near STA 3+00 in RA4, as indicated on sheet 5 of the project drawings. During dredging derrick barges and material barges require enough water depth to float. As material is loaded onto the material barge the draft (displacement of vessel to water) of the barge increases and it further sinks in the water column. To maximize digging operations during tidal ebbs GCC will use dredged areas to sit in. This will maximize allowable barge draft. Concurrently, an excavator and loader will be used to begin upland excavation. Before beginning any excavations, a haul road will be placed, offset slightly from the new top of slope. The base road shall be built and overlain with a filter media overhanging both sides of the haul road. The extra material will be rolled up around straw wattles to create an exterior berm to protect against introduction of surrounding surface water. A light coating of gravel will lie atop the fabric to hold the fabric in place. The Westside haul road will run from the north end of the pier around STA 2+00 back into the slip until it reaches STA 0+00. Once complete, a long reach excavator will begin excavating from the top of slope, working downward to MLLW +5. The excavator will load a front end loader/dump truck that will then transfer the excavated material to a stock pile location on the pier (see Attachment A4.1-1). Using a derrick with clamshell bucket, the stockpiled material will be transloaded to a barge for disposal at an offsite transloading facility. Upon completion of excavation operations, the top layers of the haul roads will be peeled back and disposed of with the upland spoils at Roosevelt Regional Landfill. This includes disposing the straw wattles, filter fabric, gravel base course, and gravel top course. The base course will be removed by having the loader scrape up the gravel and load it into the stockpile, where it will then be transloaded to the barge.

After finishing RA4, the derrick barge will focus on finishing the remaining slope cut from MLLW +5 to -3 in RA1. Once upland excavations are complete along RA1, the excavator and loader/dump truck will be mobilized to the east side. Once again a haul road will be constructed along the top of the new slope. The haul road will begin at the southern end of RA2 and work northward, up and around the slip head until it ends near STA 0+00. Gravel will only be used in areas where asphalt is not present. Asphalt haul roads will be equipped with a double layer of filter fabric, tacked down to the asphalt to catch sediment from excavator tracks. The eastside stockpile will be located near the center of RA2 around STA 2+00. The stockpile will follow the same design as on the west side. Excavation will continue with the same routine, excavating down from the top of the slop to MLLW +5. The derrick will finish the remaining slope cut from MLLW +5 to -3 along RA2. Once complete, the derrick will move down toRA3 and complete the entire slope cut.

Haul Road Decommissioning

After upland excavation is completed the haul roads that were used by the truck/loader for transporting material will be decommissioned. Decommissioning the haul road will include folding the straw wattle ends in towards the center and then rolling the filter fabric up. This method will contain the upper gravel. This procedure will be divided up in sections, ending at roadway breaks where filter fabric has been cut and overlapped. After rolling material into

manageable balls they will be loaded onto the barge and taken to the transloading facility for disposal.

4.4.3 Means and Methods

Dredging

Dredging will be accomplished by using GCC's barge mounted crane, the derrick barge *Anchorage*. The *Anchorage* is a 75 ton derrick barge that is built for dredging. The *Anchorage* will be equipped with a 7.5-yd^3 square nose re-handle bucket, a 3.7-yd^3 environmental-level cut bucket and a 5-yd^3 round-nose digging bucket. Buckets will be switched out as needed. Soil conditions will drive the choice for bucket type. GCC plans on using the environmental bucket whenever possible to help keep turbidity levels low. GCC will also slow or modify bucket cycle times, if needed, to reduce turbidity if found to be near out of compliance values.

The derrick barge will load a GCC 100-series barge measuring 50 × 164 feet. The barge will be ballasted down to create a gravity drain. At the stern of the barge, a holding well will be installed. Water will drain through a bulkhead outfitted with filter wrapped eco blocks and perforated steel plates held together with a through bolt. The plates will be flush to the eco blocks. Straw bales or similar filter material will fill the voids between the plates in order to catch sediment from entering the holding well. The filter media will need to be changed periodically so that water will continue to drain into the holding well. A daily visual inspections conducted by our staff will identify areas were filtration media needs to be changed out, All spent filtrations media will be disposed of with the dredge spoils. Once water has accumulated in the holding well, it will then be pumped via trash pumps to a flexi float outfitted with geo bags (see Attachment A4.4-2). The geo bags will be sized to empty the holding well, if needed and will sit in a containment box lined with carbon fabric. Check valves or manual on/off valves will be installed on the discharge side of the trash pumps to eliminate any possible backflow from the geo bags. Water pumped from the barges will slowly fill the geo bags and will be force filtered by gravity through the bags. The water will then run down the bags and into the lined containment box where the water will pass through a carbon fabric liner before draining back into its place of origin. The carbon fabric is designed to absorb PCB's, the project contaminant of concern.

This dewatering system is more extensive than other systems GCC has employed in the past. Attachment A4.4-8 shows the setup of the drain barge GCC used at the Todd Shipyard project. This project consisted of dredging subtitle D material and disposing at an upland disposal facility. The barge used on this job allowed the water to go through filter fabric and then drain back into the Puget Sound. All water quality requirements were satisfied on this project. The system GCC will be using on Slip 4 is superior because the water is being filtered into the holding well and then filtered through the geo bags and granular activated carbon (GAC) and filter fabric on the flexi-float.

Upon completion of dredging, the carbon fabric will be disposed of with the dredge spoils. All mechanical devices such valves, pumps, fittings and hoses will be continually checked visually for leaks. In the event a leak occurs operations will be stopped immediately and the leak will be fixed. Maximum efforts will be given to minimize any unfiltered water to enter back into the slip. If a geo bag gets punctured or begins to rupture, it will be replaced. If a substantial leak occurred, the entire flexi float can be picked out of the water and placed on the barge to be contained while the leak is fixed.

In the event that filter fabric becomes damaged and potential unfiltered water and sediment is given the chance to come through the eco-blocks, the eco-blocks will be re-wrapped and water will be pumped back on to the unfiltered side of the barge.

Dredge spoils are expected to gross 800 to 1000 tons per barge load, depending on soil densities and angle of repose. All barges will sit for a minimum of 8 hours before offloading material. If digging conditions are favorable, then GCC has the capability of loading a full barge in a day. Coordination with the RE, KRS Marine LLC (KRS), and the MIT coordinator shall be made on a daily basis to schedule barge switch outs. KRS will be notified to plan for one barge switch out per day. GCC will attempt to make barge switch outs in the early morning or late in the evening when KRS operations are likely to be slow or nonexistent. Full barges will be transported to the Lafarge transloading facility (see Attachment A4.4-3). It is standard practice to leave the material barges uncovered during transport.

The drain barge and flat deck material barges will be cleaned of all sediment at the completion of dredging. This sediment will be treated the same as all other dredged material and disposed of at the same upland facility.

Upland Excavation

The excavation operations will be accomplished using a long reach excavator equipped with a standard digging bucket. Before beginning excavations, on the slope, the hillside will be cleared of plants, shrubs, trees, and other living organics. If needed, the greenery may be chipped for better handling; it will be disposed of with the dredge spoils. Once the haul roads have been installed as described above, excavations will begin at the top of the slope and work their way downhill. The spoils will be loaded into either a 644JD wheel loader equipped with a 4.5-yd^3 bucket and installed splash guard or into a dump truck with hydro lock tailgate. If the wheel loader is used GCC also plans to fabricate a bucket cover that will contain possible spillage during transportation of spoils to the stockpile. Loader cycle times will be slowed as needed to eliminate spills. The loader/dump truck will transport the spoils to a stockpile location to be transloaded to the barge by the derrick using a clamshell bucket. Although the upland excavations spoils are expected to be fairly dry, GCC will outfit the stockpiles so that they can manage potential entrained water within the spoils (see Attachment A4.4-4). The stockpiles will be of adequate size to meet upland excavation production. For further stockpile design info, refer to Section 4.10, Environmental Pollution Control Plan.

4.4.4 Positioning Methods and Procedures

Initial Job Setup

The Contractor will use the following positioning techniques and ongoing survey practices to ensure that the horizontal and vertical limits and requirements of the dredge prism conform to the contract documents. Ongoing monitoring and calibration checks will be conducted daily. Adjustments to dredge procedures will be made immediately if monitoring data show trends inconsistent with specification requirements.

- GCC will verify Control Points #1 and #2, as indicated on sheet 7 of the project drawings. GCC will establish and use onsite benchmarks and monuments based on these control points. Project baseline and offsets will be setup. Dredge/Excavation Coordinates 100-154, shown on sheet 11 of 24 of the project drawings, will be marked.
- All survey data shall conform to:
    - Horizontal Datum: Washington State Plane North Zone (NAD -83/91) U.S. feet
    - Vertical Datum: MLLW
- Tide boards will be mounted onsite and set according to project control points at MLLW elevations. All tide boards shall be installed at locations visible to the derrick barge crane operator.
- Clamshell bucket wires will be marked to indicate the current elevation of the mudline.
- An Ohmex TideM8 electronic tide gauge (see Attachment A4.4-5) will be setup onsite to measure vertical positioning of the derrick barge. A real-time tidal broadcast via radio modem will be sent from the electronic tide gauge to the derrick barge onboard PC to be used with WinOps positioning software.

Horizontal Positioning (In-Water Dredging w/Derrick Barge)

For daily surveys GCC will use sub- meter accuracy, differential GPS to provide horizontal alignment and positioning during dredging operations. . The derrick barge will be equipped with Hemisphere R100 and VS111 units (see Attachment A4.4-6). The VS111 is a dual antenna unit that will be mounted on deck and will provide barge positioning and heading. The R100 is a single antenna unit and will be mounted to the boom tip to track bucket positioning.

Using the WinOps software and bucket tracking feature, the dredge operator can keep track of his horizontal position and areas that have already been dredged. WinOps creates a visual, real-time position for the derrick barge and bucket. Uploading backgrounds and overlays within WinOps gives the operator position, relative to existing structures and shorelines, the project stationing, and the boundaries of the dredge prism.

Vertical Positioning (In-Water Dredging with Derrick Barge)

The vertical positioning and dredging grade cut is maintained by a combination of bucket wire marks, physical tide board, and onsite electronic tide gauge (Ohmex TideM8). These systems will provide instant feed-back to the operator and confirmation that the equipment is set up properly. Any required adjustments to the system will be implemented prior to continuing dredging at the time a discrepancy is detected. Once the dredging begins, periodic checks in the dredged area using a lead line will be used to confirm that the actual cut depth elevation agrees with the bucket mark value calculation produced by WinOps using electronic gauge broadcast and manually inputted design depth elevation. Any dredging that is trending toward dredge cuts beyond the allowable elevations or beyond the limits of the dredge boundaries will be examined for cause. This review will be conducted on an on-going basis so that there is immediate feedback to the operator and corrective actions may be implemented to avoid non-compliance with the contract documents.

Horizontal and Vertical Positioning (Upland Placement with Hoe)

Slope excavation grade stakes will be shot using a total station setup at a verified project control point. Grade stakes shall serve not only as a tool for the hoe operator and grade rod holder, but also as a visual confirmation for the RE that the contractor is meeting contract specified tolerances.

A Sokkia GRX1 w/ Data Collector (or similar system) will be used to track and verify excavation cut depths. The system includes many options for corrections, including CDMA real time kinematic (RTK) network corrections via onboard GSM/GPRS modem, GLONASS, and SBAS (see Attachment A4.4-6). The system can accurately track horizontal and vertical positioning of excavations. The system will store, identify, and date each point survey. The data readout will be used to communicate the cut depth with the excavator operator as well as provide survey data for daily quantity tracking as described below.

4.4.5 Quantity Tracking

Dredging Quantity Tracking

Material dredged by derrick barge will be quantified by a combination of techniques. Barge draft measure, using an engineered displacement chart, will verify tonnage of material dredge. In-house hydrographic survey will be conducted using a Ross 825 Echo Sounder with 6-degree transducer operating at 200 KHz. The single beam echo sounder will be coupled with a sub meter GPS unit. RS232 serial data will be collected from both the echo sounder and GPS, along with the broadcast of the electronic tide gauge. All three data streams will be combined using WinOps software to provide an easting, northing, elevation (XYZ) file for the day's placement. The XYZ files will be collected daily and imported into AutoCAD to calculate volume placed. Weekly section cuts will be provided in the daily reports. Lead line surveys will be used to conduct daily surveys when electronic surveys are not suitable.

Along with the survey data and barge displacement values, real time bucket marking with WinOps dredging software will be used to track areas that have been dredged. Color coding bucket marks will serve as a means to decipher multiple passes in one location. A specified color will be used to mark the areas when final grade has been met. The daily bucket marks will be submitted on a daily basis. A cumulative bucket tracking report will also be submitted, which will include estimated quantities to date, along with a map showing all bucket marks, color-coded by date to distinguish areas from past dredging operations (see Attachment A4.4-7).

Excavation Quantity Tracking

Upland excavation quantity tracking will also be completed by using a combination of techniques. Grade stakes will be shot prior to digging to aid the operator, along with either a rodmen using a prism and total station or a rover GPS unit with data collector using a RTK reference correction via onsite base station or mobile network. The collected data will be stored and exported to a XYZ file daily, which will then be used to create triangulated irregular network (TIN) surfaces in AutoCAD. TIN comparison volume calculations will provide accurate to date quantities. These values will be checked against barge draft measure using an engineered displacement chart (see Attachment A4.6-1). This measurement will be tracked when transloading material from the stock pile to the barge. The measured amount will verify tonnage of material excavated. The original deadweight table data from Spaulding and Associates from which the barge displacement tables were derived is included in Attachment 4.8-4.

4.4.6 Transloading Material

Loaded barges will be transferred via tug boat down river to Lafarge's facility for transloading materials. Lafarge will use their McDowell Wellman unloading tower equipped with a 10-yd^3 clamshell bucket to load the dredge spoils into a concrete retention vault. A spill apron will be deployed to eliminate material from potentially dripping into the river. Once the material has been completely transloaded into the vault, it will then be loaded into lined 8 × 20-foot containers and loaded onto rail cars. The top pick forklift used to load the containers onto rail cars will be equipped with a load cell to verify tonnage of material loaded into the containers. These values will be tracked via log using container serial numbers. The liners on the containers will be properly rolled and tie wired before leaving on rail for upland disposal. All containers will have zip-tie labels attached to identify the Waste Stream ID of the loaded material. For further transloading detail, see Section 4.3, Transportation and Disposal Plan

4.4.7 Schedule and Hours of Work

Dredging and excavation operations are scheduled to begin on October 3, 2011. Crews are currently scheduled for a single 8-hour shift, Monday through Friday. The typical work shift is

from 7:00am-3:30pm, but the 8-hour window can vary as long as it is between the 6:00am –- 6:00pm window. The transloading and barge transporting activities will vary. Lafarge can operate 24 hrs a day, seven days a week and will work accordingly to always have GCC's barge unloaded by the time GCC will need it again for dredging. Shift start times and hours of work may vary to accommodate for tidal and other project constraints, to ensure that work can be completed within the permitted in-water work window. While dredging or capping in the shallow areas GCC may need to adjust shift start times to ensure that the tide will be high while the derrick barge and material barge are in shallow water to prevent grounding.

4.4.8 Key Personnel and Supervision

Sponsor	Tom Coultas	360-340-0932
Project Manager	Tom Jirava	253-606-6548
Project Superintendent	Matthew Miller	206-510-6554
Project Engineer	Tyler Waugh	253-306-3397

4.4.9 Water Quality Management

The BMP's listed in Section 4.10 will be employed by GCC during dredging operation in an effort to meet and exceed the contract-specified water quality criteria required by EPA's CWA, Section 401, Water Quality Certification (see Attachment A4.10-9) per project Specification Section 01 57 50.

4.4.10 Notifications

The following notifications will be made by the contractor at the times noted, before the start of dredging operations:

U.S. Coast Guard:

Send a letter to the Commander, with a copy to the RE, Thirteenth Coast Guard District, 915 Second Avenue, Seattle, WA, 98174-1067, at least 14 days prior to the commencement of dredging, notifying the U.S. Coast Guard (USCG) to the start of dredging operations.

Washington Department of Ecology:

Report immediately any spills into state waters, spills onto land with the potential for entry to state waters, any other significant water quality impacts, distressed or dead fish, and buried chemicals, to the Department of Ecology, Northwest Regional Office, at 206-649-7000 (24-hour phone).

Washington Department of Fish and Wildlife:

Notify Julie Klacan at 360-466-4345 (extension 272) of the owner's name, project location, starting date for work, and the CERCLA Action Authority at least three (3) working days prior to the commencement of dredging and disposal.

Tribal Fisheries Coordinator:

GCC will conduct a meeting prior to October 1st, 2011 with Ken Dreewes, the MIT Fisheries Coordinator. At the meeting GCC will explain the project location, current schedule, scope of work, marine equipment to be used, and shift times and frequencies. Ken Dreewes will address Tribal Fishing requirements and logistics. Together GCC and Ken Dreewes will formulate a plan to minimize obstructions to each others operations.

In accordance to Section 01 40 00 RAWP GCC shall notify the RE at least 14 days prior to commencing dredging.

* These notifications shall be made Monday – Thursday during normal working hours.

4.5 SURVEY PLAN

eTrac Engineering, LLC will perform hydrographic survey services as part of the LDW, Slip 4 Early Action. Single-beam and Multi-Beam topographic surveys will be employed for this project and will be performed by appropriately qualified and licensed staff. All hydrographic surveys will be in accordance with the U.S. Army Corps of Engineers (USACE) Hydrographic Surveying Engineering Manual for Navigation and Dredging Support Surveys [USACE EM 1110-2-1003 (Jan 2002)]. All land surveys will also follow appropriate state, federal and project specifications.

For all surveys, the horizontal datum will be Washington State Plane Coordinate System NAD83 (1991), North zone, U.S. Feet. All surveys will be shown in MLLW, in U.S. feet.

As requested by the contractor and required in the project specifications, eTrac Engineering will submit survey results and documentation to the RE and contractor after completing independent surveys;

- An AutoCAD electronic file containing plan view drawings with 1-ft contour intervals and spot elevations depicting high and low points plotted at 1 inch = 50 feet.
- The AutoCAD electronic file shall include the Digital Terrain Model (DTM) as 3D-polylines.
- ASCII-format processed survey data provided in XYZ format.
- Field notes, including software and equipment information, client, project, horizontal and vertical datum, units, tidal correction, survey type, alignment, and stations surveyed. Additionally, location of each sounding line, the date and time (hour and minutes) each sounding line is taken, and explanation for any line terminated early. The tide will be recorded for each line surveyed and noted on the section during the survey or a time and tide reading correlation table or field notes. Notes will include tidal data (i.e., height of tide [MLLW datum]), bar checks or sound velocity cast, position check on a known project control monument, time of the tide readings, and date and location of the tide gauge used for each area surveyed.

Independent survey events include three, single-beam echo sounding surveys (pre-construction, final dredging and excavation, and final cap acceptance) and one multi-beam echo sounding survey. All independent surveys will include topographic data above MLLW and will be supervised by appropriately qualified personnel.

Other survey responsibilities are indicated in Section 01 71 23(1.05) (C) of the project specifications.

4.5.1 Schedule for Survey Work

The schedule for each survey will be coordinated closely with the contractor to avoid vessel movement conflicts with KRS and MIT as well as potential project conflicts and general marine and land based traffic. Therefore, the specific date and duration for each survey event is included in GCC's project schedule (see Attachment A4.1-3).

In general, a hydrographic survey includes an offsite and onsite vessel/equipment mobilization followed by sonar, boat, and base station calibration procedures. Total mobilization, calibration and survey duration is expected to be between one and two days. The same is expected for the project land surveys.

4.5.2 Hydrographic Survey Equipment Specifications

eTrac owns and operates a fleet of survey vessels stationed throughout the U.S. Western seaboard. The eTrac owned vessel *Especial* is the proposed boat to be used for the LDW Slip 4 Early Action.

Especial is a 26-foot mono-hull aluminum survey vessel and is equipped with an aluminum side mount for fix mounted sonar systems, as well as a hull-mounted, single-beam sonar system. *Especial* is easily transportable for quick response to survey requests and will be dedicated to the survey efforts for this project (see Attachment A4.5-4).

An RTK-GPS Base Station (see Attachment A4.5-6) will be deployed using benchmark(s) verified on at least three survey control points near the limits of the site, established by differential leveling methods. Compact measurement record corrections will be transmitted via radio modem to the Survey platform. Accuracies will be monitored to assure the required position dilution of precision of 7.0 or less.

Multi-Beam Equipment: Sounding data will be acquired using an R2 Sonic 2024 side-mounted multi-beam sonar system (see Attachment A4.5-5). The 2024 uses 256 discrete beams with a maximum swath width of 150 degrees. The system is capable of running in either the 200-kHz range or the 400-kHz range. With the 150 degree swath width, the 2024 is capable of imaging under docks and around vessels. The 2024 has been field-proven and is valuable for a range of survey needs, including dredge payment surveys and target location/detection surveys, and has been used in shallow areas extensively. The Odom Digibar Sound Velocity Profiler (see Attachment A4.5-3) will be used in order to collect sound velocity data throughout the entire water column. This data will be entered into the survey acquisition software.

Multi-beam survey swaths will run parallel to the dock face and shoreline. Adjacent swaths will be overlapped to ensure 200 percent bottom coverage. Within the supplied survey software (QPS QINSy), a 1 × 1-foot depth colored sounding grid showing corrected soundings will be updated and logged in real-time to ensure sufficient coverage. In addition to the depth colored grid, a 1 × 1 sounding grid showing standard deviation values will also be displayed.

The standard deviation grid is helpful with real-time quality control of the multi-beam data. Final processing will be completed in the supplied software, QPS Qloud.

The horizontal and vertical positions will be acquired through an Applanix POS MV Version 4 (see Attachment A4.5-2) dual antenna GPS, receiving RTK corrections from the RTK base station. Motion data (heave, pitch, and roll) will be acquired through an Applanix POS MV Version 4 inertial motion unit. The RTK position and motion data will be applied to the multi-beam and single-beam soundings within the survey software.

Single-Beam Equipment: Similar to multi-beam, the single-beam system will employ the POS MV for position and motion corrections as well as the Odom Digibar for the sound velocity profile. Sounding data will be acquired using an Odom CV100 sonar (see Attachment A4.5-1). Hypack survey software will be used as the data logging and interface software for single-beam surveys. Refer to Attachment A4.5-7 for single-beam survey vessel tracklines.

4.5.3 Equipment Calibration

All equipment is fully calibrated on site prior to each survey and all boat offset are manually check to ensure correct equipment interface per manufacture specifications.

Prior to each multi-beam survey, a patch test is performed to calibrate heave, pitch, and roll. The procedures for this calibration are designated by the manufacture of the 2024 sonar and USACE EM 1110-2-1003 (January 2002). Location and findings of this calibration are documented in the field notes.

For single-beam surveys procedures and documentation per USACE EM 1110-2-1003 (January 2002) are followed for each survey event. All offset and bar check(s) information and findings of this calibration are documented in the field notes.

4.5.4 Recent Firm Experience

- USACE SF Richmond Training Wall Investigation—IDIQ – 2010-11, Richmond, CA
- Oakland Third Party Multibeam Survey—Oakland Deepening Project 2010-11, Oakland, CA
- Suisun Third Party Singlebeam Survey—Maintenance Dredging 2010-11, Suisun, CA
- Hamilton Wetlands Restoration Surveys—2009-2011, Novato, CA
- Port of San Francisco Pier Surveys—Multibeam & Singlebeam, San Francisco CA
- San Mateo Bridge Department of Transportation Multibeam Survey—2011, San Mateo, CA
- Seaplane Lagoon Remediation Project Multibeam, Singlebeam Survey—2011, Alameda, CA

- Santa Barbara Harbor Daily Multibeam Survey—2011, Santa Barbara, CA
- St. Paul Island Onsite Hydrographic Survey and Payment Calculations—2010, St. Paul, AK
- Ensenada, Mexico Multibeam Survey—2010, Ensenada, Mexico
- Port of Vancouver Deepening, Pre and Post Dredge Multibeam Surveys, Vancouver, WA
- Spokane River Up-River Dam Survey, Singlebeam Surveys, Spokane, WA
- Grays Harbor Channel Deepening Project, Several Multibeam Surveys, Aberdeen, WA
- Port of Portland Terminal 4 Rebuild, 50+ Singlebeam Surveys, Portland, OR
- Alcoa Sediment Remediation and Capping Project, 250+ Multibeam Surveys, Vancouver, WA
- Seattle Waterfront Remediation and Capping Project, Multibeam Surveys, Seattle, WA

4.5.5 Survey Staff

Gary Chapman, Washington PLS

Project Title: Surveyor of Record, Washington PLS Registration #42427

Company: AES Surveying

Contact Info: Cell: 360-930-2080

3472 Lowell Street

Silverdale, WA 98383

Education: BA, Washington State University

AS, Olympic College

Mr. Chapman is a registered Washington PLS with over 20 years of land surveying experience and has been licensed in the State of Washington since 2005. Gary has taken a lead role in the technological development of AES computing and data collection systems to streamline production and keep AES competitively strong.

Mel Saunders, ACSM-THSOA & Alaska PLS

Project Title: Hydrographic Survey Supervisor, ACSM-THSOA (Registration #152, see attached)

Company: eTrac Engineering LLC

Contact Info: Cell: 907-229-7351

637 Lindaro Street

Suite 100

San Rafael, CA 94901

Mr. Saunders is a registered ACSM and Alaska PLS. Mel specializes in Hydrographic Surveying, Computer Systems Development and Support, Marine Instrumentation design, and Land Surveying.

Mel has a combined 40 years of survey experience in the following areas: hydrographic surveying as a geophysical equipment operator including analog, single-channel digital and multi-channel digital systems, analog and digital side scan sonar systems, navigator using both range-range and GPS systems; land surveying, including land development, lot surveys, retracements and construction surveying; survey computations, including map development using AutoCAD; survey team leader with overall responsibility for survey completion; extensive computer experience in hardware and software support, and network administration; as well as managing computer operations including a networked AutoCAD environment.

Christopher Raymond, EIT

Project Title: Hydrographic Survey/Engineering, Washington Engineer in Training

Company: eTrac Engineering LLC

Contact Info: Cell: 425-647-1707

637 Lindaro Street

Suite 100

San Rafael, CA 94901

Mr. Raymond obtained his B.S. in Civil Engineering at Washington State University. His professional experience includes 8 years of experience as a Dredging Consultant, Hydrographic Surveyor, Marine Construction Superintendent, Dredging Superintendent, Health and Safety officer, Civil Design Engineer, Construction Administration and Marine Construction foreman. Chris is a registered Engineer in Training; he is also certified in Construction Quality Control, Occupational Safety and Health Administration 30-hour, Sediment and Erosion Control lead, and Transportation Worker Identification Credential (TWIC). Chris has specific experience in environmental dredging, AutoCAD Civil 3D design and management including DTM analysis

and volume calculations, and other software packages including Hypack and QPS Quinsy/Qloud.

Greg Gibson, LSIT

Project Title: Hydrographic Survey Crew, California Land Surveyor in Training

Company: eTrac Engineering LLC

Contact Info: Cell: 707-529-0327

637 Lindaro Street

Suite 100

San Rafael, CA 94901

Mr. Gibson possesses a B.S. in Geomatics Engineering from California State University Fresno. His professional background is in Land and Hydrographic Surveying, specializing in Marine Construction and Dredging. He is a registered Land Surveyor in Training, and has extensive experience in many facets of surveying, including bridge and dock layout, topographic surveys, roadway alignments, riparian and littoral boundary determination, photogrammetry, LiDAR/Laser Scanning, and volume calculations. His hydrographic survey experience includes single-beam and multi-beam data collection, data processing, and final product generation.

David Neff

Project Title: Hydrographic Survey Crew

Company: eTrac Engineering LLC

Contact Info: Cell: 415-517-0020

3472 NW Lowell St

Silverdale, WA 98383

Mr. Neff brings extensive hydrographic survey experience as well as experience in AutoCAD and GIS integration with the dredging industry. David has a B.S. in Ocean Engineering from Rhode Island, Kingston, RI. With management of hydrographic projects from regions through the western United States including work for the oil industry in the Cook Inlet, Alaska, his professional experience includes 6 years of hydrographic survey specific experience as a Survey Manager, Project Manager, and Field Engineer. David is certified in Open-Water Diving, OpQual Abnormal Operation Conditions, Hazardous Waste Operation and Emergency Response level II, and TWIC. David is also a member of the Marine Technology Society.

Jared E. Ottmar, LSIT

Project Title: Land Survey Crew, California Land Surveyor in Training

Company: AES Surveying

Contact Info: Cell: 360-271-0060

3472 Lowell Street

Silverdale, WA 98383

Education: BA, Washington State University

Jared has literally grown up in the business of land surveying. He accompanied survey crews while performing large land tract surveys in the Olympic Mountains, beginning at the age of 10. While in high school he worked summers on surveying crews and by the time he graduated from college he was running his own field crew. Jared has begun his path toward his Professional License having acquired his Land Surveyor in Training certificate.

4.6 VESSEL MANAGEMENT PLAN

4.6.1 Vessel Description

GCC plans on using the following equipment to perform in-water work activities: (See Attachment A4.6-1)

- DB Anchorage—75TN derrick barge - 50 × 125 feet
- DB Columbia – 133TN Derrick Barge – 58′ x 142′
- (2ea) GCC 100-Series Barges—50 × 164 feet
- Big Eagle—395 HP Push Boat with Twin Screw—17 × 40 feet
- Tug Redwood City—14 × 70 feet

4.6.2 In-Water Haul Routes

GCC will load capping material at CalPortland's Pioneer Aggregates barge loading facility in DuPont, WA and transport it to the Slip 4 project site by barge. Estimated distance one-way is approximately 42.3 miles (see Attachment A4.6-2).

All capping material that cannot be loaded at CalPortland's Pioneer Aggregates barge loading facility in DuPont, WA, will be trucked into CalPortland's Seattle Rock Yard adjacent to the GCC Marine Yard on the Duwamish River. Here, the capping material will be dumped into a stock pile and loaded onto GCC's barge via wheel loader. Once the barge has been loaded, it will be transported to the Slip 4 project site. Estimated distance one way is approximately 3.0 miles (see Attachment A4.6-3).

Dredge spoils will be transported to Lafarge transloading facility down river from Slip 4 on the Duwamish River. Estimated distance one-way is approximately 2.0 miles (see Attachment A4.4-3).

Loads will be a maximum of approximately 1200 tons per barge when fully loaded. An estimated 27(ea) loaded barges with cap material will be delivered to Slip 4. According to GCC's planned schedule, an estimated 20 (ea) barge loads of dredge and excavation spoils are anticipated, however the total number of dredge and excavation spoils barge loads will vary with the amount of overdepth taken. All barge haul routes mentioned above will be transported by Tug Redwood City (or similar size tug).

GCC's Big Eagle push boat will either be used to move vessels on the project site or will be tied up to the bow of the derrick barge and used as a rudder while positioning for dredging and capping.

4.6.3 Notifications

GCC will notify the USCG by letter to the Commander, Thirteenth Coast Guard District, 915 2nd Avenue, Seattle, WA, 98174-1067, at least 14 days prior to the commencement of dredging, notifying the USCG to the start of dredging operations. A copy of the letter will also be sent to the RE.

4.6.4 Means and Methods

GCC shall monitor navigation activities near dredging activities. Unless approved by the RE, the Contractor will conduct operations in such a manner as to prevent obstruction to navigation. In the event that the Contractor's construction equipment (dredges, barges, work boats, anchor buoys, etc.) obstructs any channel or berthing areas as to make difficult or endanger the safe passage of vessels, said equipment shall immediately be moved on the approach of any vessel, to such an extent as may be necessary to afford a practical passage. GCC shall cooperate with other waterway users and coordinate directly with the RE for access and timing of operations. GCC shall keep the USCG apprised of the position of its equipment and shall notify them 24 hours in advance of changes of operations or equipment location. Signal lights shall be displayed in accordance with USCG Instruction Manual M16672.2 Navigation Rules, International-inland (COMPTINST M16672.2), 33 CFR 81 Appendix 'A' (international) and 33 CFR 84 through 33 CFR 89 (inland), as applicable.

GCC will moor all equipment to derricks barges. Derrick barges will be held in place by spuds. In tidal situations, when material barges and other pieces of equipment cannot tie up to the derrick because of low water, they will tie up to the existing pier.

Vessels will not need on-site fueling. Vessels will be fully fueled before arriving onsite. If fueling is needed GCC will transport the vessel via tug boat to the nearest commercial fueling facility.

For information on eTrac's hydro-survey vessel, *Especial*, please reference Section 4.5 Survey Plan and Attachment A4.5-4. *Especial* is labeled "SeaTrac 3D".

4.6.5 Schedule and Hours of Work

Barge transportation will start the first week of October 2011 and will continue through the end of January 2012. Barge transportation will be coordinated on a daily basis. Barge transportation will likely happen in the early morning hours or in the late evening in efforts to minimize adjacent jobsite tenant operations.

4.7 TRAFFIC CONTROL PLAN

All traffic control will be provided in accordance with Specification Section 01 55 80 – Public Convenience and Safety/Temporary Traffic Control. No public lane closures are anticipated by GCC and no traffic control permit will be needed.

The First Student bus facility, located adjacent to the project site, has heavy traffic throughout the day with buses leaving and returning to the parking lot. GCC is aware of this and plans to minimize any inconveniences. Since GCC will be taking dredge spoils downriver to the Lafarge transloading facility this significantly reduces traffic congestion compared to handling the material onsite.

The bulk of the traffic will result from demolition debris being hauled offsite and material being imported for capping. GCC plans to have flaggers onsite when trucks are entering and leaving the jobsite to ensure safety to other vehicles and pedestrians. All flaggers will carry a current flagging card from the State Department of Labor and Industries. Temporary signage will be installed to make the public aware that truck traffic and flaggers will be present during normal working times.

Contractor parking will be inside the fenced area of the jobsite. (Refer to site map, Attachment A4.1-1.) This will prevent congestion on the First Student and Crowley properties. GCC does not plan to have any parking on the First South property.

4.7.1 Coordinating with Adjacent Property Owners

GCC will coordinate with the adjacent property owners through the RE to minimize any inconveniences. GCC will notify the RE and she will contact the property owners any time GCC feels that their operations may have an impact on the adjacent properties.

4.7.2 Daily Truck Trips

During dredging operations in October and November there will be very little truck traffic because the material will be exported by barge. The heaviest traffic is expected to occur in the month of December when GCC will be bringing in some of the capping material and hauling away demolition debris by truck. It is estimated that during these times approximately 25 to 30 trucks will come through the jobsite per day. GCC will attempt to schedule the trucks during times when there is less traffic during the day. This will not only improve GCC's truck cycle time, but will have less of an impact on the surrounding areas, specifically the First Student bus operations. Demolition activities are scheduled to be completed in December, and material being brought in by truck for capping is scheduled for December as well. There should be very little truck traffic in January, and, therefore, it should not have an impact on adjacent property owners.

Trucks shall enter onto 8th Ave S. from East Marginal Way, turn left onto 11th Ave S. and proceed through the project gate. Empty trucks will be loaded with the broken concrete from the pier demolition. Loaded trucks will follow the haul route to the south and exit through the project gate. After exiting the project site, the loaded trucks will pass Kelly Ryan and Crowley's yards. Active operations are assumed to be in progress. Truck drivers will be advised to proceed with extreme caution through this area. The trucks will turn right onto 8th Ave S. and proceed onward to East Marginal Way. See Attachment A4.7-2 for truck haul routes. Further coordination protocol and additional health and safety procedures regarding haul route traffic are provided in Appendix B, Site Specific Health & Safety Plan. Should trucks hauling away demolition debris need washing the truck will go up to the truck wash as shown in Attachment A4.1-1 to be washed off before leaving the site.

4.7.3 Pedestrian Traffic

Because GCC does not want pedestrians coming onto the jobsite, signs will be posted on the security fences to discourage unauthorized persons from entering. Barricades and other warning or guidance devices will be used as necessary to separate pedestrian traffic from the work area.

4.7.4 Haul Routes

Onsite haul routes will be delineated with caution tape as needed to keep pedestrians aware of the traffic. Haul routes through the properties adjacent to the work area will have signage signifying that flaggers and truck traffic are present.

4.7.5 Site Security

The site will be secured by a temporary chain-link fence and locked at all times that work is not being performed. This will keep traffic out of the work area during non-work periods and deter vandalism and theft.

4.7.6 Traffic Control Apparel

All traffic control personnel shall where reflective vests and hard hats for the flagging and control of traffic.

4.7.7 Construction Signs

All traffic control signs shall be new or "acceptable" and will be accepted based on a visual inspection by the RE.

4.7.8 Traffic Control Plan Map

See Traffic Control layout map, Attachment A4.7-1.

4.8 CAPPING PLAN

This plan has been prepared in accordance with Specification Section 35 23 24. This plan includes the proposed cap material sources, products, and suppliers; means of transporting, measuring, and stockpiling materials; equipment, navigation positioning and tracking; and proposed methods for the placing capping material.

4.8.1 Capping Material Sources, Products, and Suppliers

The waterway cap, filter material, habitat mix, and beach sand will be provided by CalPortland's Pioneer Aggregates (#B 335) in DuPont, WA. The cap armor and heavy loose Rip rap material will be provided by CalPortland's White River Quarry (#2A487) in Enumclaw, WA.

Prior to its onsite use, the specified capping materials will be evaluated for its chemical and/or physical properties. Initially, two samples of each specified material requiring chemical testing will be taken.

Chemical parameters, analytical and extraction/cleanup methods, and acceptance criteria shall follow Table 01450-1 of Section 01 45 00.

The material below will be analyzed for the following:

- Waterway cap:
    - Gradation
    - Material density (ton/ yd^3)
    - Semivolatile organic compounds (SVOCs)
    - Inorganics
    - PCBs
    - Total organic carbon (TOC)
- Filter material:
    - Gradation
    - Material density (ton/ yd^3)
    - SVOCs
    - Inorganics
    - PCBs
    - TOC

- Habitat mix:
    - Gradation
    - Material density (ton/ yd^3)
    - SVOCs
    - Inorganics
    - PCBs
    - TOC
- Beach sand:
    - Gradation
    - Material density (ton/ yd^3)
    - SVOCs
    - Inorganics
    - PCBs
    - TOC
- Cap armor:
    - Gradation (12–15 in. rip rap and 4–8 in. quarry spalls)
    - Degradation factor
    - Los Angeles wear
    - Specific gravity
- Heavy loose rip rap:
    - Gradation
    - Degradation factor
    - Los Angeles wear
    - Specific gravity

Gradation testing shall strictly follow guidelines set forth in Section 35 23 24 [2.08] and shall be conducted by a USACE-certified lab. All chemical testing reports will be conducted by a certified NELAP lab independent of the material supplier.

Special Blended Mix

The filter material shall be uniformly amended by blending GAC. Blended mix shall meet a minimum concentrate of 0.5 percent GAC by weight. This will be achieved by using

CalPortland's custom auger blending system that is mounted directly to the conveyor system. CalPortland's site engineer will develop and calculate an algorithmic formula to sync up their auger blender with their conveyor system so that they can meet the required uniform blend specification.

To eliminate the potential of carbon particles suspending in water column or floating to the surface, all filter material will be pre-wetted before placement. Material will be inspected both visually and physically to verify material is been pre-wetted enough for placement. Material will continue to be inspected through placement to make sure material does not dry out. Pre-wetting filter material will consist of a simple 2-in trash pump equipped with a fire hose attachment. Pre-wetted material will sit for 10 to 15 min before placement to maximize hydrogen bonding.

Work Sequence

The following will be the order in which the backfill placement work will progress:

1. Place boundary berm prior to the start of dredging.
2. Submit and obtain acceptance on post dredge/excavation survey.
3. Place toe berm and slope cap at RA3.
4. Place toe berm at bottom of slope cap in RA2 and RA1.
5. Place slope cap at RA2 and RA1.
6. Place outfall area cap (swale included).
7. Place waterway cap.
8. Place armored cap.
9. Place habitat mix.
10. Confirm design cap thickness met per progress surveys.
11. Conduct the post-capping survey.
12. Boundary Area Verification Sampling
13. Response action (if needed)

4.8.2 Means and Methods

4.8.2.1 Material Transportation and Stockpiling

Capping materials will be transported to the project site via barge or truck. The filter material, waterway cap, and habitat mix loaded onto barge will come from CalPortland's DuPont facility. Material will be loaded via conveyor belt. Smaller amounts of the filter material and habitat mix will be trucked in and stock piled onsite along with beach sand. A majority of the cap

armor and heavy loose rip rap will be trucked from the quarry and loaded onto barge at CalPortland's Seattle Yard on the Duwamish River. The remaining cap armor and heavy loose rip rap will be trucked to the project site and stockpiled. All onsite stockpile locations will be prepared prior to dumping material to eliminate any cross contamination with native soil or damage to the underlying asphalt (for stockpiles in paved areas). These clean material stockpiles will be located in the same location as the excavated spoils stockpiles were located. The excavated spoils stockpiles will be thoroughly cleaned prior to placement of any clean material. The visqueen and filter media will be rolled up and disposed of with the spoils.). GCC will load capping material onto a 50 × 164 × 11 foot flat-deck material barges (GC 100 Series) where it will remain on deck, in stock pile, until placed in the designated area(s) of the project.

4.8.2.2 Equipment to Be Used for Backfill Placement

In addition to the flat deck barges described above, the subaqueous backfill materials will be placed using the following equipment. See Attachment 4.8-1 for pictures of the rock boxes and buckets.

- 75 ton—Derrick barge (*Anchorage*)
- 10 yd^3—Custom built "Bombay" rock box
- 8 yd^3—Custom built, "Euclid" rock skip box
- 5 yd^3—Round nose digging clamshell bucket
- 7.5 yd^3—Square nose re-handle bucket
- 4.5 yd^3—Environmental level cut bucket
- 4.5 yd^3—Front-end loader, John Deere Model 644 or similar.

4.8.2.3 Positioning and Survey Control

Initial Job Setup

The Contractor will use the following positioning techniques and ongoing survey practices to ensure that the horizontal and vertical limits and configuration of the backfill area conforms to the contract document requirements. The procedures include extensive ongoing monitoring requirements and operations to adjust backfill procedures, should monitoring data show trends inconsistent with specification requirements.

- GCC will verify Control Points #1 and #2 as indicated on sheet 6 of the project drawings. GCC will establish and use onsite benchmarks and monuments based on these control points. Project baseline and offsets will be setup. Dredge and excavation coordinates 100 to 154 shown on sheet 11 of the project drawings will be marked with stakes and offsets.
- All survey data shall conform to:

  - Horizontal datum: Washington State Plane North Zone (NAD -83/91) in U.S. feet
  - Vertical datum: MLLW

- Tide boards will be mounted onsite and set according to project control points at MLLW elevations. All tide boards shall be installed at locations visible to the derrick barge crane operator.
- Skip box and clamshell bucket lines will be marked to indicate the elevation of the backfill below the water surface.
- An Ohmex TideM8 electronic tide gauge will be setup onsite to measure vertical positioning of the derrick barge. A real-time tidal broadcast via radio modem will be sent from the electronic tide gauge to the derrick barge's onboard PC to be used with WinOps positioning software.

Horizontal Positioning (In-Water Placement with Derrick Barge)

For daily survey GCC will use sub meter accuracy, differential GPS to provide horizontal alignment and positioning for placing backfill material with the derrick barge. The derrick barge will be equipped with Hemisphere R100 and VS111 units. The VS111 is a dual-antenna unit that will be mounted on deck and will provide barge positioning and heading. The R100 is a single-antenna unit and will be mounted to the boom tip to track bucket positioning.

Each work day the contractor will generate a map using their differential GPS positioning software (WinOps), showing bucket placement locations for that day, the date of the work, existing structures and shorelines, the project stationing, and the boundaries of the backfill. This map will then be included with the daily report. Cumulative bucket mark maps will show to-date placements and will be color coded by day of placement (see Attachment A4.8-2). This information is kept in order to track the location of each day's work. The area covered for that day's backfill operations is compared to the total area to be backfilled in order to track progress relative to the schedule.

Vertical Positioning (In-Water Placement with Derrick Barge)

The vertical positioning and placement of the material is maintained by the use of skip box or bucket wire marks, a physical tide board, and an onsite electronic tide gauge (Ohmex TideM8). These systems will provide instant feedback to the operator and confirm that the equipment is set up properly. Any required adjustments to the system will be implemented prior to continuing backfill placement at the time a discrepancy is detected. Once the backfill placement begins, the area that has been backfilled will be periodically checked with a lead line to confirm placement elevations and any corrections required are made. Any backfilling that is trending toward placement beyond the allowable elevations or beyond the limits of the backfill areas will be examined for cause. This review will be conducted on an on-going basis, giving immediate feedback to the operator and allowing any corrective actions to be implemented, avoiding non-compliance with the contract documents.

Horizontal and Vertical Positioning (Upland Placement with Hoe)

Slope excavation grade stakes will be shot using a total station setup at a verified project control point. Grade stakes shall serve not only as a tool for the hoe operator and grade rod holder but also as a visual confirmation for the RE that the contractor is meeting contract specified tolerances.

4.8.2.4 Quantity Placement Tracking

Material placed by derrick barge will be quantified by a combination of techniques. Barge draft measure using an engineered displacement chart will verify tonnage of material placed. In-house hydrographic survey will be conducted using a Ross 825 Echo Sounder with 6-degree transducer operating at 200 KHz. The single-beam echo sounder will be coupled with a sub meter GPS unit. RS232 serial data will be collected from both the echo sounder and GPS, along with the broadcast of the electronic tide gauge. All three data streams will be combined using WinOps software to provide an XYZ file for the day's placement. The XYZ files will be collected daily and imported into AutoCAD to calculate volume placed. Weekly section cuts will be provided in the daily reports. Lead line surveys will be used to conduct daily surveys when electronic surveys are not suitable (see Attachment A4.8-3).

The daily bucket mark maps will have the following data attached to the report:

- Drawing showing areas of placement and color-coded to verify placement location of different materials
- Calculated footprint of material placement to nearest 0.1 acre
- Each material type daily total shall include total lifts, quantity placed in weight by tonnage, and volume by cubic yard
- Toe and boundary berms will be tracked in lineal foot of placement.

Each truck load of capping material brought in and placed upland will have a certified scale weight ticket with reference to material type. All barge loaded capping material will show total tonnage of each material loaded. Tonnage is based on material loaded into the hopper prior to mixing. These values will be checked using barge draft measure (see Attachment A4.8-4). The loaded barge's draft will be measured before placement and it will be measured again when empty. Density factors for material type will be supplied by vendor (ton/yd^3) and will be checked in-house by GCC using grab samples. The material will be loaded into a 1 × 1 × 1 foot stainless steel box and weight on a commercial scale. This may be done several times if necessary. All the values will be averaged and compared to vendor's value. Each day's placement will be tracked using barge draft measure. Daily tonnage and material densities will be logged and used to check against survey data volume calculations. Each daily report will show draft measures and tonnage calculations for each material placed that day (see Attachment A4.8-5).

4.8.3 Capping Installation

The capping approaches are described below. For further detail of BMP's, see Section 4.10.

Before the start of any dredging operations, the boundary berm will be placed using the derrick barge equipped with the "Bombay" rock box. A John Deere 644 loader (or equal) will be placed on deck of the material barge to load the Bombay box.

Capping placement will resume after dredging and excavation is complete and the final post dredge and excavation survey has been accepted. There will be no placement of capping material in RA5, RA6, or RA7 until pier demolition is complete.

Capping activities will begin with toe berm slope cap placement. The toe berm will be placed from South to North with final placement terminating at the pier face. Directly following the berm placement, the derrick barge will use a combination of filter material, cap armor, and habitat mix to complete the design grade capping in RA3. After the completion of RA3, the derrick barge will begin placing filter material, cap armor, and habitat mix in RA1, RA2, and RA4 along the slope up to +5 MLLW. After finishing slope cap up to +5 MLLW, concurrent capping operations will begin. The derrick barge will place the filter material and cap armor that surround the swale and outfalls in RA4 while a hoe and wheel loader place the remaining slope cap above +5 MLLW in RA1 and RA2. After the derrick has placed enough of the swale, the hoe will place the heavy loose rip rap outfall scour protection and remaining slope improvements. Meanwhile, the derrick barge will work its way south, finishing the remaining capping and swale construction in RA4. After RA4 is complete, the waterway cap in RA5 and RA6 will follow. After the hoe is finished with all slope improvements and other miscellaneous capping operations in RA4, it will begin habitat enhancement areas in RA1 and RA2, including the installation of 14 (ea) large timber logs with root wads. Logs shall be attached to buried eco blocks with chains and turnbuckles and the area will be finished with beach sand.

Onsite cap verification thickness will be provided by both visual aid (e.g., grade stakes) and exported XYZ data logged during hydro and topo survey progress surveys. The XYZ data will be uploaded into AutoCAD Civil 3D and imported into the template cut sections to provide a visual confirmation to the RE that design tolerances have been met. The onsite RE will provide quick review of data and authorization to proceed with next level of capping when design tolerances have been met. GCC will request verification starting at 20ft intervals upon starting capping work.

Throughout cap placement, GCC will strategically plan capping operations so that spudding down in completed cap areas is minimized. The above placement scheme allows the derrick barge to sit in unfinished areas throughout the entire placement process. GCC's tug service provider has nozzles surrounding their props, increasing torque efficiency while minimizing prop wash. All onsite propeller-powered boats will be advised before arriving onsite that propeller wash will be minimized to their best ability.

4.8.4 Schedule and Hours of Work

Cap placement will begin immediately following acceptance of the post dredge and excavation survey. Work schedule sequencing requires coordination between barge loading, derrick placement rate, tides, upland placement rate, and adjacent property activities. The capping operation is currently set as a single 8-hour shift, Monday through Friday. The typical work shift is from 7:00am – 3:30pm, but the 8-hour window can vary as long as it is between the 6:00am – 6:00pm window. Capping activities will be scheduled to accommodate the permitted in-water work period. Shift start times and hours of work may vary accordingly.

4.8.5 Key Personnel and Supervision

Project Sponsor	Tom Coultas	360-340-0932
Project Manager	Tom Jirava	253-606-6548
Project Superintendent	Matthew Miller	206-510-6554
Project Engineer	Tyler Waugh	253-306-3397
Independent Surveyor	eTrac Engineering	415-462-0451

4.9 CONTRACTOR QUALITY CONTROL PLAN

GCC takes pride in the quality of its work and it is GCC's goal to "do the work right the first time". GCC understands the importance of quality on this project and will stride to do the best job and meet all the project quality requirements.

This Contractor Quality Control Plan covers all construction operations, both onsite and offsite, including any work by subcontractors, fabricators, and suppliers.

4.9.1 Quality Control Organization

Every employee will be responsible for doing quality work and abiding by the contract documents. In this section GCC defines its quality control organization and chain of command. A quality control organization chart is attached in QAPP worksheet #5, of the Field Sampling Plan, Attachment A4.9-6.

The Project Manager, Tom Jirava, will be GCC's CQCR and will be assisted by the Project Superintendent, Matthew Miller, and Project Engineer, Tyler Waugh (see Attachment A4.9-1 for resumes). Tom has many years of working on projects for GCC and takes pride in performing quality work. Tom will be responsible for ensuring that GCC is meeting all quality requirements for the project. He will have complete authority and responsibility to take any action necessary to ensure contract compliance. Tom will be responsible for providing and maintaining an effective CQC system for all construction tasks. This will include approving all information GCC submits to the City, monitoring testing activities, scheduling weekly CQC meetings, providing meeting minutes to the RE, resolving non-conformances, recommending work stoppages, managing corrective action documentation, and submitting the daily CQC reports to the RE.

The Project Superintendent, Matthew Miller, will also be involved with quality control conformance. Matthew will always be present on the jobsite, inspecting work performed by GCC and its subcontractors. He will report any quality deficiencies to Tom Jirava and assist in any corrective action procedures. Matthew will assist, as needed, in preparing submittals, writing daily quality control reports, and communicating any quality concerns to Tom and the RE. Matthew has been on several dredging projects with GCC and is GCC's most qualified dredging superintendent. He is an expert using the WinOps software system. GCC is confident this software will allow GCC to perform very accurate dredging and meet all the plans and specifications.

Project Engineer, Tyler Waugh, will also assist in GCC quality operations. Tyler has experience with dredging and remediation work and will serve as another supervisor of quality

compliance for the project. Tyler will assist Tom and Matthew in drafting submittals, monitoring testing, and writing quality control daily reports.

GCC believes that involving all the project supervisors mentioned above in the quality control operations will result in providing the best work to the City.

4.9.2 Submittals and Material Testing

GCC will schedule due dates for upcoming submittals via a Submittal Control Document with a 3-week look-ahead schedule.

Tyler Waugh will be predominantly responsible for gathering information and drafting submittals. All submittals will be reviewed by Tom Jirava prior to submitting. GCC will always have the Quality Control Representative review the submittals and recommend any revisions prior to submitting to the City, to help prevent the need for re-submittals and save time.

Any information from subcontractors, suppliers, or testing agencies that needs submitting will be reviewed by GCC's CQCR prior to submitting.

All submittals will be turned in via the Unifier software system. GCC will also turn in submittals via email and hard copy if requested by the RE.

All import material will be tested and the results submitted for approval prior to placement. A table of the tests to be performed on import materials is included in Attachment A4.9-2. GCC will coordinate with the testing agencies to ensure that all materials are tested and the results are submitted at least 14 days prior to placement. A log of which tests have been performed will be kept and maintained by GCC. A sample log is included in Attachment A4.9-3.

As-Built Drawings

GCC will update as-built drawings on a daily basis per Specification Section 01 78 39. GCC will show all progress that occurred each day and track any changes encountered on the project.

4.9.3 Tracking and Reporting Construction Deficiencies

If any construction deficiencies are observed by any GCC personnel or any City representatives, GCC will immediately contact the RE to discuss a solution to the deficiency. If the RE is not onsite at the time the deficiency is discovered, then she will be contacted by telephone and e-mail. If the RE cannot be reached, GCC will continue to contact City representatives until the issue can be discussed and resolved. GCC will document the deficiency, including the date and time it is discovered, and will submit this documentation on an approved form to the City and keep an in-house copy of the form. A sample copy of the Construction Deficiency Reporting Form is in Attachment A4.9-4.

Once the deficiency is reported, GCC will analyze the situation and propose corrective actions to the City. Written approval or recommendations will be provided by the City before any corrective actions take place. GCC will record which corrective actions the City requires and document the actions GCC employs on an approved Construction Deficiency Corrective Action Form when correcting the problem (a sample of the form is included in Attachment A4.9-5). After corrective actions have taken place, GCC will obtain the City's approval prior to proceeding with scheduled work.

4.9.4 Sampling and Analysis Plan

See the attached Sampling and Analysis Plan (see Attachment A4.9-6), which contains the Field Sampling Plan and the QAPP.

4.10 ENVIRONMENTAL POLLUTION CONTROL PLAN

This Environmental Pollution Control Plan is one tool to assist GCC in complying with all federal, state, and local regulations while performing the work specified in the LDW Slip 4 Early Action project.

Any change(s) to the procedures specified in this plan will require the plan to be modified and approved by the RE prior to implementing the proposed change(s).

All employees of GCC and subcontractors who are assigned to this project are subject to the requirements and procedures specified in this plan as well as to the contract specifications. All those assigned to this project will be required to read this plan and any referenced documents to gain general awareness of the environmental requirements associated with this project. Any person or parties subject to this document shall contact the RE through their Environmental Coordinator or Site Supervisor for questions or clarification.

As described in Section XIII of the ASAOC (USEPA 2006b), if waste material accidently is released from the Slip 4 site or if conditions exist that could cause an accidental release, GCC will take all appropriate actions to prevent, abate, and minimize the release. GCC will immediately notify the RE of the incident or conditions, who will then relay the information to the RPM. In the event that the RPM cannot be reached, the RE will contact the EPA Region 10, Emergency Response Unit Duty Officer at 206-553-1263.

In addition to the above, if the waste material consists of a hazardous substance, the RE will also immediately notify the National Response Center at 800-424-8802. After notifications have been made, the RE will follow up with a written report to the RPM within seven days of the incident or conditions.

4.10.1 Environmental Pollution Control Plan Overview

BMPs to reduce the short-term environmental effects of this project are specified in the Contract documents (plans and specifications), and have been summarized in a Biological Assessment for the project (Integral 2007) and in a USFWS consultation letter (USFWS 2011) (see Attachment A4.10-4).

A number of BMPs are included as design requirements in the specifications to minimize water quality impacts during all phases of the removal action. GCC will adhere to these requirements, which include the following:

- Sequencing dredging and capping activities to reduce the duration that dredged/excavated surfaces remain exposed before capping.

- Specifying stable cut slopes along the prism boundary and between internal dredging units to reduce the potential for sloughing.
- Requiring excavation from the top of the slope down, and capping from the bottom of the slope upward, to reduce the potential for sloughing.
- Requiring bulkhead demolition concurrent with bank excavation to reduce the potential for sloughing.
- Using an environmental dredge bucket to the extent practical, considering debris and other site conditions and with the overall goal of minimizing sediment re-suspension during dredging.
- Eliminating multiple bites with the dredge bucket.
- Specifying maximum cut thicknesses to limit any sloughing on the cut face.
- Eliminating sweeping with the bucket or stockpiling of dredged material on the bottom.
- Eliminating the use of grading equipment below the water line.
- Filtering return water entering Slip 4 from the materials barge, as material is dewatered on the barge. Material may be mounded on the materials barge to promote drainage.
- Eliminating overfilling of the materials barge.
- Avoiding or minimizing tug activity in Crowley's middle berth during dredging.
- Anticipating relatively low dredge production rates of 400–1,000 yd^3cy/day.
- Specifying cap materials with low fines contents to minimize turbidity.
- Controlling liquids and avoiding spillage from transloading activities.
- Monitoring of water quality per the WQMP and EPA's CWA 401 certification; with corrective actions to be implemented as needed.
- Placement of a rock berm at the southern boundary of the removal action area before dredging, to potentially limit offsite transport of "mud wave" turbidity.

The following key items and areas of work will be closely monitored by GCC to ensure compliance with environmental regulations. Under each section BMP to be employed by GCC are described.

Water Quality

Controlling and maintaining water quality both on land and in Slip 4 will be a top priority for GCC. Water quality will be monitored throughout the project by the City. Upland stormwater and turbidity within Slip 4 will be the primary water quality concerns. GCC will adhere to the 401 Water Quality Certification shown in Attachment A4.10-9. BMPs for controlling turbidity within Slip 4 are described in detail under the Dredging and Capping sections below.

Stormwater and Stockpile control

Refer to Section 4.10.2 for information on stormwater and stockpile control.

Air Quality and Dust Control

GCC equipment will be properly maintained and in good working condition to prevent air pollution. All smog prevention systems will be in place on the heavy equipment to ensure that GCC minimizes air pollution. All major pieces of equipment will be inspected daily and documented on company equipment inspection forms. One copy of this form will be kept with the equipment and one will be stored within GCC's office. This allows GCC to always be informed if there are any equipment problems and shows when any routine maintenance is due. Any equipment problems that could affect air quality will be immediately addressed.

GCC will employ BMP's to make sure onsite dust and debris is controlled. Demolition activities will create dust particles. GCC and its demolition subcontractor will monitor dust onsite and will take all precautions to prevent dust and debris from leaving or spreading around the jobsite. These precautions include the use of water trucks to spray down dusty areas, street sweepers to sweep up dust, brooms, and dust pans. Any sawcutting dust and debris will be collected by a vacuum as the sawcutting is carried out. It is GCC's practice to keep a very clean site. Any sawdust created from cutting lumber will be swept up and disposed of whenever sawdust is created.

Noise Pollution

GCC will keep all noise levels in compliance with city, state, and federal regulations. All construction devices and equipment shall be operated with a muffler and any other noise reducing appliances.

Debris and Piling Removal

All debris and derelict piling removed prior to and during dredging will be disposed of at the landfill with the other contaminated material. GCC feels that this is the cleanest way to handle the debris and derelict piling because GCC anticipates contaminated material will still cling to the removed debris and piling.

Creosote fender piling will be handled differently than the other debris and derelict piling. GCC will remove the fender piling with the crane and a vibratory hammer. Once the fender pilings are extracted, they will be lifted to the pier where equipment will be ready to handle and dispose of the piling. A containment area will be set up to prevent material clinging to the piling from being tracked around the jobsite. The containment area will consist of puncture-resistant, impervious Visqueen and will be surrounded by straw wattles. GCC does not plan to stockpile the fender piling. Once removed, the piling will be handed off to an excavator with a grapple attachment, cut down to manageable sizes, and expeditiously loaded into demo boxes to be taken to a disposal or approved recycling site.

Decontamination Procedures for Personnel

Any person that comes into contact with contaminated material will go through the decontamination (decon) area before entering back into the clean zone. The personnel entering the decontamination areas will be equipment operators, grade checkers, supervisors, and laborers. There will be three decontamination areas. One will be on the derrick barge and there will be one at both of the stockpiles. The decontamination area on the derrick barge will be located next to the ladder that workers will use to get from the dredge material barge to the derrick barge. Workers that come into contact with contaminated material on the material barge will go through the decontamination area immediately after they travel from the material barge to the derrick barge. The decontamination area will have a wash tub where the workers will brush off material from their boots and raingear with a scrub brush.

Materials such as boots, rain pants, shovels, brooms, dust pans, and survey rods will also be deconned. Survey rods, shovels, brooms, and dust pans will also be scrubbed off with a brush in the wash tub before being taken back into the clean area. Wash tub water will be changed out as soon as it appears dirty, no less than one time per day. Dirty water from the derrick barge decontamination station will be poured back onto the material barge. A garbage can will be located adjacent to the decontamination area as well. Workers will dispose of their gloves in the garbage can should they become dirty while out on the material barge. Filter fabric will be laid out on the deck of the derrick barge in the decontamination area. This will catch any splash water from the wash tub. Garbage cans and wash tubs will be decontaminated at the end of the job.

The decontamination areas on land will be set up similar to the decontamination area on the derrick barge. It will have a base layer of filter fabric, a wash tub, and a garbage can. Dirty water from the wash tub will be poured into the stockpile. This way the water will end up being pumped through the treatment system before entering baker tank. All workers that come into contact with contaminated material will go through the decontamination area to be decontaminated before entering back into the clean area.

Decontamination Procedures for Equipment

Any equipment that leaves the contaminated area will be cleaned and washed before entering the clean zone. The loader and excavator performing the bank excavation will stay on the haul roads while performing the work. Once excavation is complete the excavator and loader will go through the truck wash to wash all material off of the buckets and tracks. The truck wash will be located on a portion of the haul road. This will prevent equipment from contaminating the soil or asphalt when traveling to the truck wash. Dirty water in the equipment wash containment will be pumped into baker tanks and then treated at Marine Vacuum Services, Inc.

Derrick Barges will not come into contact with the contaminated material; however, the clamshell buckets will need to be cleaned off. These will be rinsed off with a pressure washer

while out over the material barge. Work skiffs will not come into contact with contaminated material and will not need to be decontaminated. The deck of the material barge will be washed off with a hose and pressure washer. Water will then be collected and pumped through the filtration bags. Any remaining sediment on the barge will be swept up and disposed of at Roosevelt Regional Landfill. The filter fabric on the flexi-floats will be rolled up and disposed of at Roosevelt Regional Landfill as well. Pumps, hoses, and pressure washers will be decontaminated by flushing with clean water.

The ecology blocks that come into contact with contaminated material will be decontaminated by rinsing with clean water and scrubbed with brushes. All Visqueen and filter fabric that comes into contact with contaminated material will be discarded at Roosevelt Regional Landfill.

Excavation, Stockpiling, and Re-handling

During excavation, stockpiling, and re-handling material to the barge, GCC will be very diligent about keeping the environment clean. As mentioned above, haul roads and stockpiles will be specially designed to prevent tracking of mud and discharging contaminated water. While excavating, GCC will position the truck/loader as close to the excavator as possible to minimize the swing radius and bucket travel distance while loading the excavated material. Operators will be well aware that it is imperative to not let material fall onto clean ground. Once truck/loader is loaded with excavated material they will stay on the haul roads as they travel to the stockpile. A spotter will make sure that the truck/loader is dumping the material directly into the contained stockpile and that no material falls onto the ground outside of the stockpile. Should any material fall outside of the stockpile, shovels, brooms, and dust pans will be on hand to immediately clean up the material and place it into the stockpile.

The derrick barge will transfer the material to the barge before the stockpile is full. A re-handling clamshell bucket will be used to move the material. The advantage of the re-handle bucket is that it creates a tight seal, preventing material from leaking out of the bucket. Steel plates along the bottom of the stockpile will prevent the bucket from damaging the impervious Visqueen layer. The stockpile will be closely monitored to ensure that it remains water tight. The operators and field supervisors will look at the stockpile and check for leaks several times a day. If a leak is noticed immediate action will be taken to ensure that the water is contained.

At the end of the excavation all of the Visqueen will be put on the material barge and disposed of with the dredge material. Any material stuck to the ecology blocks will be rinsed off, swept up, and disposed of with the contaminated dredge material.

Dredging

The following BMPs will be employed during the dredging operations to ensure that GCC is in compliance with all environmental regulations and offsite release of re-suspended sediment is prevented.

1. An oil boom will be deployed as needed to control surface oils and other floating debris that may appear during dredging.
2. Each pass of the dredge bucket will be complete. The Contractor will not take multiple bites of dredge material at the mudline before raising the bucket to the water surface.
3. The Contractor will not perform excessive dredging at the toe of cuts, preventing undercutting and consequent sloughing and re-suspension of dredge material.
4. The Contractor will not stockpile dredge material below the water surface.
5. The Contractor may elect to pause the dredge bucket near the water surface during its ascent to minimize entrained water within the bucket prior to taking it to a barge.
6. A work boat will be onsite to collect any debris found floating in the water as a result of dredging and disposal operations.
7. The Contractor will securely anchor or tie up all work vessels to prevent grounding. Barges, tugs, and derricks will be positioned and operated in deeper water, and propellers will be operated in a controlled fashion to minimize the potential for propeller wash.
8. The material barges will have adequately high sidewalls to prevent spillage of dredge material to the surface water and will not be overfilled to the point where dredge material could overtop the sidewalls.

If water quality monitoring indicates unacceptable impacts from dredging, the following responses will be considered and implemented as needed for compliance with the 401 Water Quality Certification:

- **Operational Controls** may include the following:
    - Dredging at the head of the slip during lower tidal stages, as practical.
    - Excavating bank areas in the dry, as practical.
    - Decreasing the rate of dredging. This may include decreasing the velocity of the ascending or descending bucket as it moves through the water column; pausing the bucket before digging; or pausing the bucket for longer periods at the water surface to facilitate drainage.
    - Limiting hours of operation to favorable tidal cycles (e.g., avoiding tidal periods that appear to be associated with elevated turbidity conditions).
    - Modifying the positioning of the barge(s).
    - Modifying dredge bucket movement to dislodge adhering material.
    - Stopping work.
- **Equipment Options and Engineering Controls** may include the following:

- Use of an enclosed or "environmental" bucket when practical.
- Use of silt curtains/silt screens.

Capping

GCC will adhere to the requirements of the capping specifications, which are designed to limit the potential for water quality impacts (e.g., the specified materials reduce potential for turbidity during placement, the specified lift thicknesses reduce potential for dislodging underlying sediments).)

Should water quality monitoring indicate unacceptable impacts from capping, the following responses will be considered and implemented as needed for compliance with the 401 Water Quality Certification:

- Decreasing the rate of capping
- Releasing cap material from the bucket just above the water surface
- Adjusting the rate of release of cap materials, using smaller bucket or skip box, or increasing the swing arc to better pluviate and create thinner lifts
- Placing a thinner first lift of capping materials.

4.10.2 Temporary Erosion and Sediment Control Plan

Controlling sediment and erosion is a key issue to this project and GCC will strive to meet or exceed all expectations both onsite and offsite. Included in this section is a list of BMPs to prevent and control erosion, protocols to maintain effective erosion control, and corrective actions that may be necessary.

The erosion control leader for the project will be the Project Superintendent, Matthew Miller. He is a Certified Erosion and Sediment Control Lead. If there are any concerns regarding erosion or sediment control, Matthew will be the point of contact. Project Engineer, Tyler Waugh, and Project Manager, Tom Jirava, will also assist Matthew, supervising erosion and sediment control (ESC). If Matthew is not available, Tom or Tyler shall be contacted immediately.

Contact Information:

Matthew Miller – Erosion Control Lead

Cell: 206-510-6554 (24 hours)

matthew.miller@kiewit.com

Tyler Waugh

Cell: 253-306-3397 (24 hours)

tyler.waugh@kiewit.com

Tom Jirava

Cell: 253-606-6548 (24 hours)

tom.jirava@kiewit.com

Temporary Water Pollution/ Erosion Control

GCC intends to have no polluted water leaving contained areas, or returning back into Slip 4. A susceptible location to water pollution will be the stockpiles. The stockpiles will be closely monitored and water will be prevented from leaving the stockpile using the Best Management Practices described above in the Water Quality section.

Erosion will be controlled by the use of specially designed haul roads, and excavation methods to minimize erosion. Haul roads will be constructed with filter fabric placed underneath a gravel topping layer. By placing a gravel haul road, any trucks or equipment traveling between the excavator and the stockpile will not disturb the existing ground. The haul road will be checked daily and inspected to make sure equipment is not tracking mud between the excavator and the stockpile.

While excavating, GCC will dig from the top to the bottom of the slope. This will prevent material from sloughing down the slope and into the water.

Stormwater and Stockpile control

Possible sources of stormwater pollution include runoff from the excavated soil stockpile, and water from the decontamination area. GCC plans to employ several BMP's on shore to prevent contaminated water from being released into the slip and tracked around the jobsite. Stockpiles of excavated materials will be designed so that no stormwater or water contained in the excavated material will leave the stockpile. GCC will create a barrier to contain the stockpiled materials by placing ecology blocks around the stockpile area. To prevent water from leaving the area GCC will line the stockpile with heavy duty 40 mil Visqueen or similar. The Visqueen will line the entire area beneath the stockpile and also continue up over the ecology blocks. This will create an impervious barrier which will prevent any water from leaving the stockpile. On top of the Visqueen, along the bottom of the stockpile, GCC will place one-inch thick steel plates. This will protect the Visqueen from being torn by debris within the excavated material, and also protect the Visqueen from being torn by the dredge bucket that will be transferring the material to the spoils barge. Any water collected within the stockpile area will be pumped into a baker tank and then will be taken to Marine Vacuum Services for off-site treatment. Stockpiles will be marked with caution tape and signs to prevent unauthorized people from coming close to the stockpiles.

Stockpile Water Treatment Filtration System

GCC will be using Marine Vacuum Services to treat water that accumulates in the stockpiles. GCC will pump the water into 21,000 gallon Baker Tanks. Two Baker Tanks will be onsite to

ensure that there is plenty of capacity for collecting the water. Marine Vacuum Services will pump the water from the Baker Tanks into their tanker trucks and then take the water to their treatment plant to be treated and discharged. The water will be batch tested by Marine Vacuum Services before it is taken to their treatment plant. Stockpiles will be covered with Visqueen during periods that they are not being used. This will prevent excess stormwater from accumulating within the stockpile.

Erosion and Sediment Control Best Management Practices

Because GCC will first employ Best Management Practices (BMP's) to avoid any on-site erosion control problems. GCC will place filter socks in all catch basins within the worksite to prevent sediments from entering the water drainage system. GCC will also employ clean work methods to avoid spillage of material, stockpiles will be designed to prevent leakage, and truck washes will be contained and inspected before and after each use. This section describes in further detail how several of these elements will be addressed and managed.

Should a problem occur where clean or contaminated soil or sediment is entering Slip 4 storm drain systems during a rain event GCC plans to correct the situation and mitigate it by any or all of the following means.

- Installing Silt fences
- Installing Filter fabric
- Using Straw Bales/Straw Wattles
- Sand bags
- Visqueen

Erosion or sloughing of bank materials into the slip will be mitigated by GCC's excavation sequence. The excavators will dig from the top of the slope down to prevent material from sloughing into the slip. During non-working hours, stockpiles will be covered with Visqueen to prevent water from entering the stockpile. The Visqueen will be draped over the stockpile and held down around the edges with sand bags placed on top of the ecology blocks. This will ensure that no additional water will come in contact with the contaminated soil, and the Visqueen will not blow off of the stockpile. The Visqueen will be inspected daily to ensure that it is intact and functioning properly.

Although erosion control BMP's will be inspected daily by GCC employees, an official temporary erosion and sediment control (TESC) inspection report will be prepared at least once every five working days, each working day during runoff producing rain events, or within 24 hours after a runoff-producing rain event. The TESC Inspection Report shall include when, where, and how ESC BMP's were installed, maintained, modified, and removed; repairs needed, and repairs made; and observations of ESC BMP's effectiveness. These reports shall be provided to the RE the following working day according to specification 00 72 00 1.03 M. 3. A sample of the inspection report form is included in Attachment A4.10-6.

4.10.3 Spill Prevention Control and Countermeasures Plan

Onsite SPCC Coordinator, Matthew Miller, will act as GCC's onsite SPCC coordinator. He will be responsible for ensuring compliance with and performance of the SPCC Plan.

Contact Information:

Matthew Miller – SPCC Coordinator

Cell: 206-510-6554 (24 hours)

Office: 253-943-4200

matthew.miller@kiewit.com

Should Matthew be unavailable SPCC issues can be brought to the attention of the Project Engineer or Project Manager (see contact information below).

Tyler Waugh – Project Engineer

Cell: 253-306-3397 (24 hours)

tyler.waugh@kiewit.com

Tom Jirava - Project Manager

Cell: 253-606-6548 (24 hours)

tom.jirava@kiewit.com

24-Hour Spill Response Subcontractors

In the event of a spill that cannot be contained with GCC's onsite supplies, 24-hour on-call spill response subcontractors must be notified immediately. The companies listed below may be contacted 24 hours per day for immediate spill assistance.

Foss Maritime/Environmental	206-281-3800/3810
Global Diving and Salvage	206-623-0261
National Response Center Environmental Services	800-337-7455
Emerald Services	206-832-3000
National Response Center	800-424-8802

The National Response Center will be contacted immediately if there is any spill of more than 25 gallons.

Spill Cleanup Supplies

GCC will provide Spill Cleanup Kits in an area that is easily and quickly accessible to all work areas in order to control, contain, and clean up any contaminants anticipated. Two Spill Kits will be located onshore, and one will be located on the derrick barge. The derrick barge will also contain in-water materials and equipment as noted below.

Each Spill Cleanup Kit will include:

Description	Quantity
Absorbent pads	50 lb
8-foot absorbent socks	10 each
4-foot absorbent socks	10 each
Absorbent pillows	3 each
10-foot absorbent boom	2 each
Loose absorbent material	25 lb
Stardust absorbent sweep	3 lb
Contractor trash bags	5 each
Shovel	1 each
Broom	1 each
Spill response manual and personal protective equipment (PPE)	1 each
Dust Pan	1 each
Spill Response Manual & PPE	1 each

In-Water Supplies

GCC carries two harbor booms onboard the crane barges, but will contract for additional booms as needed. The most likely boom to be contracted would be an 8 × 12 in. flexible floatation oil containment boom either with an air or a rolled "closed cell" foam filled cylindrical buoyancy chamber, which provides the boom with high-reserve buoyancy. Deployment and recovery of the boom would use a wear pad to minimize abrasion. All crane barges also carry an Oil Spill Response Kit (i.e., Tug Pack) that includes:

> 5 in. × 10 feet sorbent boom (4 each); 19 in. × 100 feet sorbent sweep (2 each); 16 × 20 in. sorbent pads (1 bale); 33 × 40 in. 4-mil spill bags (25 each); duct tape (1 each), petro flex gloves (2 each); and 95 gal poly over pack drum (1 each).

A weatherproof sign will be posted on each Spill Cleanup Kit that will contain emergency contact information and quantities of supplies each kit contains. Any supplies used will be

replaced so the kit always has a full inventory. See Attachment A4.10-1 for a copy of the Spill Cleanup Kit Sign.

Spill Response Procedures

If a spill occurs from any of GCC's marine equipment or landside operations, the Site Supervisor will coordinate the incident response and any oil spill cleanup activities.

Any spill onto soil or water will be reported to the project manager, Tom Jirava, and GCC will immediately notify the RE in addition to the legally required federal, state, and local reporting channels. A spill of more than the reportable quantity of 25 gallons will also be reported to the National Response Center. A copy of the spill notification checklist is included in Attachment A4.10-2. The initial spill response actions will follow the list below:

- Assess the danger to personnel from the hazards of fire, explosion, and fumes
- Notify supervisor immediately, get additional help if needed
- Stop the cause: if possible, close valves, close drains, plug holes, etc.
- Contain the spill; deploy boom, place absorbent pads, etc. Prevent spill from entering drains and/or waterways, if possible
- Cleanup is to be accomplished under the direction of the site superintendent or designee.

Shipboard Oil Pollution Emergency Plan

In addition to following this SPCC plan, all of GCC's marine equipment has an approved Shipboard Oil Pollution Emergency Plan on-board the vessel. In the case of a water emergency, GCC will follow this plan. The plan is included as Attachment A4.10-3.

Training

It is GCC's responsibility to instruct and train each employee to recognize, control, and prevent unsafe and hazardous conditions connected with their work, and be aware of and understand those safety and health regulations applicable to the work environment.

Training sessions will be documented, including subject of training, trainers, and attendees and will be available for review at the jobsite office.

In addition to the project specific training, all GCC salaried personnel are required to attend annual Operations Meetings, which include training pertaining to Environmental Compliance with emphasis on SPCC while working in the marine environment.

Additional Controls and Precautions to Prevent Spills

Below is a list of additional precautions GCC will take to prevent spills on this project.

- Oil and Hazardous Substances (OHS) shall be placed in approved containers. Containers must be inspected to ensure integrity prior to the transfer of material, and periodically when used for storage of OHS. All containers shall be properly secured (i.e., drum covers on) when not in use. All containers shall be stored in approved lockers or facilities (i.e., NFPA flammable) which are maintained in a clean and orderly manner. All containers shall be secured or emptied as well as protected prior to transportation.
- Valve and system alignment shall be checked by competent personnel prior to start-up of transfer operations. Equipment and transfer connections shall be monitored by personnel stationed at appropriate locations to minimize the potential of a release of the OHS being transferred.
- Tanks and drums receiving OHS from transfer systems that are not equipped with overfill protection equipment shall be monitored to prevent overflow. A minimum of 3 inches of head space or 3 percent of the container's capacity (whichever is greater) shall be left empty at the top of the tank or drum to allow for product expansion. Equipment and support components shall be wrapped or contained as necessary to prevent leakage and damage. The fill pipe or hose shall have a shut-off valve on the discharge end.
- Where the fill pipe is either located out of the direct line of sight of the receiving unit, not easily accessible, or under poorly lit conditions, a buddy system shall be used. One person shall monitor the receiving unit while another individual(s) shall monitor the discharge unit and fill pipe/hose. Two-way communication shall exist throughout the transfer operation.
- Night-time OHS transfer operations will not normally be undertaken. Request for a clearance to perform night-time operations will be through the RE to ensure adequate lighting and containment measures are employed.
- No OHS will be disposed into the sanitary sewer, drainage system, storm drainage system, waterway, or trash container/dumpster without approval of the RE.
- Storm drain catch basins, sanitary sewer manholes, floor drains, and other access holes within 50 feet of the discharging/receiving units shall have spill absorbent diapers placed atop it to prevent flow into the sewer system.
- When transporting containers into or out of confined or restricted areas, an individual shall direct the movement of the transport vehicle to prevent hitting any obstacles.
- All equipment (i.e., valves, fill lines, etc.) exposed to potential mechanical damage shall be protected to minimize the potential of a spill event.
- Additional preventative measures required to minimize the potential of a spill event shall be implemented. This may involve personnel briefings on job requirements, use of oil boom containments, staging of spill kits, established preventative and maintenance schedule of OHS transfer and storage systems and equipment, etc.

- All containers of OHS with a storage capacity of 55 gallons or greater in capacity, shall be equipped, fitted with, or located in an impermeable secondary containment with sufficient capacity to contain 110 percent of the total volume of all containers. Portable tanks are classified as containers. Storage containers in uncovered locations must also have an additional capacity for 4 inches of rain. Dangerous waste containers may have more stringent requirements.

Site Zone Demarcation

Various locations around the project site will be marked in the following ways:

- Any haul roads where contaminated material is being transported will have caution tape along the sides of the road to prevent unauthorized people from entering these areas.
- Personnel decontamination zones will have caution tape around the area to keep "clean" personnel from entering the decontamination areas.
- Any areas outside of the areas with caution tape will be considered a clean area.
- Stockpiles will have signs that read "Do Not Enter – Contaminated Material" surrounding the stockpile areas as well as danger tape. The signs will be clearly visible to keep anyone without proper PPE from entering the stockpile area.

Any personnel visiting the site will be advised of areas where contaminated material is being transferred, and will not be allowed to enter without project manager authorization.

4.11 SITE SPECIFIC HEALTH AND SAFETY PLANS

Site Specific Health and Safety Plans are provided in Appendix B.

4.12 CONSTRUCTION CHECKLIST

The following Construction Checklist has been prepared based on requirements of the contract documents and includes items that will be in place and operational prior to the start of any ground breaking activities. The checklist will be used as a general reminder of items to be complete before removal activities commence. The list shall not preclude the Contractor from meeting the detailed requirements of the contract documents.

- Job Startup
  - RAWP approval
  - Preconstruction submittals
  - HAZWOPER training
- Jobsite mobilization
  - Clear staging areas
  - Install project sign
  - Set-up temporary facilities/trailers per site plan
  - Install temporary fence
  - Spill kits onsite and stocked per SPCC plan
  - Erosion control/dewatering BMP installation
  - Debris disposal area
  - PPE disposal area
- Safety
  - Site safety sign-in/out log posted
  - Site-specific Health and Safety Plan available onsite
  - Visitor summary sheets
  - First aid kits
  - Stretcher and blankets
  - Eye wash
  - Air horn
  - PPE, material safety data sheet, emergency contacts, emergency routes, first aid kits accessible
  - Fire extinguishers in place
  - Job hazard analyses completed
  - Delineate haul routes, decontamination areas, stockpiles
  - Field wash
  - Boot wash

  - Traffic control
  - HAZWOPER certificates onsite
- Equipment
  - Truck washout installed
  - Water access
  - Vacuum truck – available
  - Lafarge transloading yard prepped
  - Spare dewatering pump
  - Oil booms
- Coordinate with current site tenants prior to initiating any on-site work.

5 CONSTRUCTION QUALITY ASSURANCE

CQA will be managed in accordance with the CQAP (Integral 2010b) as approved by EPA. This section summarizes key elements of the CQA activities and provides additional details on management of the CQA program.

5.1 SUBMITTAL MANAGEMENT

The Contractor coordinates assembly of all submittals and verifies them for accuracy, completeness, and compliance with the Contract requirements prior to transmitting to the RE. Each submittal shall have a submittal cover sheet that includes the submittal number, Contractor's contact information, project title and public works number, transmittal date, description, contract references, and Bid item number.

All original copies of submittals shall be provided to the RE and scanned for electronic delivery to the appropriate reviewers (e.g., EPA, City, Integral, etc.). Electronic copies shall be uploaded into the City's tracking database (Unifier).

Unless otherwise indicated in the Contract, the Contractor shall allow the RE ten (10) Working Days to review and to return the submittal to the Contractor.

The RE upon receiving the submittal with date stamp, log into a tracking database, and route the submittal to the COM/QAO and appropriate qualified staff for their review and comment. The COM/QAO will attach the submittals to the Weekly Quality Assurance Report and forward to the PS, PM, RPM, and ACOM.

The reviewers shall have eight (8) days to review and respond back to the RE. Responses will be recorded into the tracking database by the RE with electronic notification to the Contractor. Logs summarizing submittal activity will be provided to the project team at whatever frequency is established at the pre-construction conference. An electronic and paper archive of all submittals will be retained by the RE.

5.2 WEEKLY PROGRESS MEETINGS

During construction, the City will hold weekly progress meetings led by the RE and attended in-person by EPA's RPM, the City's SCM, PS, PM, and COM/QAO (Integral) and the Contractor's PM and Site Supervisor. The EPA's ACOM (TechLaw) will participate in the meeting via phone. Typical meeting agenda includes: schedule, review of submittals, safety and security, coordination with adjacent property owners, monitoring, requests for information

(RFIs), change orders, communications and other topics as needed. The RE will prepare meeting notes and provide them to the project team. Meetings will be held in the City's job trailer.

5.3 INSPECTION, SAMPLING, AND VERIFICATION ACTIVITIES

5.3.1 Overview

The Contractor will conduct CQC inspections, sampling and testing, and monitoring activities to ensure compliance with the terms and conditions of the contract. The City, assisted by Integral, will monitor the CQC activities to verify compliance with the contract requirements. The COM/QAO will also conduct CQA sampling and testing, and monitoring activities. Table 5-1 is adapted from the CQAP and summarizes the required monitoring activities and frequencies for each of the construction elements. Table 5-1 will be used to assist in scheduling and tracking these activities. The COM/QAO will update the table on a weekly basis per the CPM's schedule information and include it in the weekly CQA reports.

5.3.2 Verification of Survey

In addition to activities identified in the CQAP, the City will be providing checks on the Contractor's independent surveyor.

5.4 CQA DOCUMENTATION AND REPORTING

Substantial construction documentation will be generated during removal action construction activities, as described in Section 4 of the CQAP (Integral 2010b). The Contractor will be responsible for CQC. The City and COM/QAO will be responsible for CQA (i.e., to verify that the required CQC measures have been implemented). Key CQA documentation (with relevant CQC documentation) is discussed below.

Daily Construction Quality Control Report

The Contractor will prepare daily CQC reports, as described in the Contract Documents (Seattle 2011a) and the Contractor's CQC Plan, and submit them to the RE. The RE will distribute the daily CQC reports to the project team. The COM/QAO will review the daily CQC reports and advise the RE on the contractor's compliance with the Contract Documents. The RE will forward the CQC reports to EPA as an attachment to the weekly CQA report.

Weekly Quality Assurance Report

The COM/QAO will prepare weekly CQA reports and submit them to the City PM who will forward them to EPA's RPM and ACOM (TechLaw), with copies to Boeing.

Water Quality Monitoring Reports

Water quality monitoring will be performed by the CQA team in accordance with the WQMP (Integral 2010c) and requirements of EPA's CWA 401 Water Quality Certification. All field and analytical water quality monitoring data will be provided electronically to EPA's RPM, Water Quality Manager, and ACOM (TechLaw). Integral will prepare and submit a Water Quality Monitoring Report to the City for review. The final Water Quality Monitoring Report will be submitted by the City to EPA within 60 days after completion of construction, as part of the Removal Action Completion Report (RACR).

Hydrographic and Topographic Survey Reporting

The Contractor will complete daily progress surveys and acceptance surveys in accordance with its approved Survey Plan. The Contractor will submit the reports to the RE. The RE will distribute the surveys to the project team. The COM/QAO will review the Contractor's daily progress and acceptance surveys, including submitted drawings, field notes and quantity computations and advise the RE on the Contractor's reports.

Sediment Verification Sampling

Sampling of surface sediments/soils and bank cap material will be conducted by the City CQA team in accordance with the CQAP (Integral 2010b) for the following purposes: documentation of the pre- and post-construction boundary area conditions, documentation of the post-excavation bank slope conditions, confirmation of the post-construction slope cap, and confirmation of post-construction sediment quality on the cap surface.

Import Material Characterization Reports

The Contractor will submit a Pre-Construction Testing Report for chemical and physical analysis of import materials as specified in the Contract Documents (Seattle 2011a). Reports will be submitted for acceptance by the City and EPA no later than 14 calendar days prior to the commencement of material placement.

Waste Characterization Testing Reports and Waste Manifests

The Contractor will submit Waste Characterization Testing reports for chemical analysis of waste materials when additional characterization is required by the landfill. In the event that dredging operations produce treated wastewater discharging to sanitary sewer, the test reports will also meet the requirements of the King County Industrial Waste discharge permit. All characterization will be in accordance with the requirements of the Contract Documents (Seattle 2011a). The Contractor will submit all transportation-related shipping documents in accordance with the Contract Documents (Seattle 2011a). Reports will be submitted no later than 7 calendar days prior to the proposed material shipment or wastewater discharge.

5.5 FIELD CHANGE DOCUMENTATION

The City RE will meet weekly with the City PS, CPM (Contractor) and COM/QOA(Integral), and ACOM (EPA) to review the weekly CQA report and to keep the EPA informed of continuing events as the remediation work proceeds. Any work not in accordance with the EPA-approved removal design drawings, specifications, work plans, and/or documents will be brought to the attention of EPA. In some cases the remedy will involve the Contractor correcting the Work to comply with the Contract Documents. In other cases, changes to the design may be needed, which will require a Change Order.

In the event that a change or changed condition is encountered by the Contactor as defined in the Contract Documents (Seattle 2011a), or if CQA inspections reveal out-of-specification conditions requiring a change in the design or construction process, the City's RE and PS will review the condition to assess what revision to the Work/Contract may be required to maintain consistency with the intent of the Contract Documents. When immediate direction is required, a Field Memo (Figure 5-1) may be issued by the RE to the Contractor after consulting with the PS to recommend the needed revision(s) to the Work/Contract and obtaining the ACOM and RPM approval.

Any changes to EPA-approved documents must be approved by EPA before being implemented. EPA will review these recommended changes to ensure the change is consistent with cleanup objectives and is protective of human health and the environment. In addition, EPA review will ensure that the change conforms to performance standards, applicable or relevant and appropriate requirements, and requirements of the SOW. In this capacity, EPA will review and approve the design documents and other Contractor submittals, to ensure that the CQC program is consistent with the removal design objectives.

Upon approval by EPA, the Field Memo will be signed and sealed by the PS (a registered P.E.) and become part of the contract documents. The Contractor will document the changes as described in Specification Section 01 78 39 - Project Record Drawings (Seattle 2011a).

Information on Field Memos and their status will be provided in the weekly CQA report. The RE will track Field Memos on a potential change order tracking log (Figure 5-2), which will also be used to track RFIs.

5.6 POST-CONSTRUCTION DOCUMENTATION

Record Drawings, Manuals, and Certificates

The Contractor is required to submit record drawings for various elements of the construction, including the pier demolition, dredging/excavation/capping surveys, and capping/outfall scour protection limits and materials in accordance with Specification Section 01 78 39 –Project Record Drawings (Seattle 2011a).

Pre-Final Punch List

Pursuant to Specification Section 01 45 00 – Quality Control (Seattle 2011a), near the completion of all work or any increment thereof established by a completion time set forth in the Specifications, the Contractor's CQCR shall conduct an inspection of the work and develop a punch list of items that do not conform to the contract documents. Such a list of deficiencies shall be included in the CQC documentation, and shall include the estimated date by which the deficiencies will be corrected. The CQCR shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the City that the Site is ready for the Pre-Final Inspection.

Following the City and EPA performed Pre-Final Inspection, the RE will prepare a consolidated list of items (i.e., the pre-final punch list) to be completed or corrected after inspection. The Contractor may also be asked to assist the RE and COM/QAO in the preparation of the pre-final or final inspection reports.

6 PROJECT SCHEDULE

This section provides a schedule of activities for completion of the Removal Action Work, including inspections, meetings, and documentation. It also contains descriptions and a schedule for developing and submitting other required Removal Action plans, to be prepared upon completion of the Work.

6.1 REMOVAL ACTION ACTIVITIES

The contractors critical path schedule has been submitted as Appendix A, Attachment A4.1-3.

6.2 OTHER REMOVAL ACTION PLANS PROVIDED BY CITY

Upon completion of Removal Action work, additional plans and reports will be provided by the City to EPA, as required by the ASAOC (USEPA 2006b) and described in the DAR (Integral 2010a). A brief description of the post-work documents is provided below. The estimated schedule for submittal is provided in Table 6-1.

6.2.1 Removal Action Completion Report

The RACR will follow EPA guidance for closeout reports (Close Out Procedures for National Priorities List Sites, EPA 540-R-98-016). It will contain a description of the work described in the Contract Documents, this RAWP, and the work that was actually performed. In the report, a registered professional engineer will certify that the removal action has been constructed in accordance with the contract documents. The report will provide as-built drawings, signed and stamped by a professional engineer, showing the area and depth of the location remediated.

The final report will include a good faith estimate of total costs or a statement of actual costs incurred in complying with the ASAOC, a listing of quantities and types of materials removed offsite or handled onsite, a listing of the ultimate destination(s) of those materials, a presentation of the analytical results of all sampling and analyses performed (including a map showing the locations of any confirmatory samples), and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits). All analytical data collected under the ASAOC will be provided electronically to EPA. A final Water Quality Monitoring Report may be submitted as an appendix to the RACR.

The RACR will also contain a description of ICIP implementation to date, with copies of all implementing documentation, a schedule for completion of all outstanding ICIP tasks, and a proposed submittal date for a draft and final Institutional Control Implementation Report.

The RACR will be submitted within 60 days after completion of the construction phase of the removal action.

6.2.2 Long-Term Monitoring and Reporting Plan

The City shall prepare a Long-Term Monitoring and Reporting Plan for the removal action following completion of the RACR. The goal of the plan is to monitor the long-term effectiveness of the remedy. The Long-Term Monitoring and Reporting Plan will describe the required monitoring activities, including inspections and analyses, and associated schedules; the responsible party for performing each activity; the specific reporting requirements, and the process to be followed for addressing any contingency or corrective actions.

The Long-Term Monitoring and Reporting Plan will include monitoring objectives, an overview of the monitoring approach, design of the monitoring program (e.g., sampling strategy, station locations and replication, field sampling methods, laboratory methods), data analysis and interpretation, reporting requirements, and a schedule. The plan will include, as appropriate, visual inspections, bathymetric surveys, sediment deposition monitoring, chemical monitoring, and sediment sampling in capped areas and non-capped areas (including excavated areas) to monitor for recontamination.

The Long-term Monitoring and Reporting Plan will also include a description of monitoring of institution controls to ensure that all requirements remain in place and that the ICIP continues to work effectively. The plan will include notification requirements to EPA when an institution control fails or a land use restriction is violated, and provisions shall be included that describe what actions should be taken in the event of a failure or violation, and what entity should be responsible for addressing the problem.

6.2.3 Institutional Control Implementation Plan

The Institutional Control Implementation Report will document complete implementation of the ICIP, including copies of all relevant paperwork (e.g., easements, filings with Recorders Offices).

As described in Section 10.5 of the DAR (Integral 2010a) a RACR will be provided after completion of the construction phase of the removal action. It will contain a description of the ICIP implementation to date, with copies of all implementing documentation, a description of the review process and stakeholder input to the ICIP, a schedule for completion of all outstanding ICIP tasks, and a proposed submittal date for a draft and final Institutional Control Implementation Report.

The Institutional Control Implementation Report will document complete implementation of the ICIP; including copies of all relevant paperwork (e.g., permit application forms, easements,

covenants, deed notices, state registries, and public advisories). This report will be submitted to EPA and Ecology under requirements of the ASAOC for Removal Action for the Slip 4 EAA.

6.2.4 Long-Term Monitoring Report

Data from long-term monitoring will be assembled into reports and submitted to EPA in accordance with the schedule set forth in the Long-Term Monitoring and Reporting Plan. Based on long-term monitoring results, EPA will evaluate the effectiveness of the cleanup and determine if future response actions are needed to achieve the cleanup objectives.

Table 6-1. Post-Removal Action Submittals

RA Document	Submittal Timeframe	Estimated Date[a]
Draft Removal Action Completion Report	Within 60 days after completion of RA construction phase	May 5, 2012
Final Removal Action Completion Report	Within 30 days after receipt of EPA comments on Draft RACR	July 4, 2012
Draft Institutional Control Implementation Report	In accordance with approved schedule in Final RACR	Sept. 3, 2012
Final Institutional Control Implementation Report	In accordance with approved schedule in Final RACR	Nov. 14, 2012
Draft Long-Term Monitoring and Reporting Plan	Within 60 days of EPA approval of Final RACR	Sept. 3, 2012
Final Long-Term Monitoring and Reporting Plan	Within 30 days after receipt of EPA comments on Draft Long-Term Monitoring Plan	Nov. 14, 2012
Long-Term Monitoring Report(s)	In accordance with approved schedule in Final Long-Term Monitoring & Reporting Plan	Annually, beginning Nov. 14, 2013

Notes:
[a] Dates in this column are estimates for planning purposes only and are not to be interpreted as legal deadlines.

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